



Lifestyle and obesity in South Pacific youth : baseline results from the Pacific Obesity Prevention in Communities (OPIC) project in New Zealand, Fiji, Tonga and Australia

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Lifestyle and Obesity in South Pacific Youth

BASELINE RESULTS FROM THE PACIFIC OBESITY PREVENTION IN COMMUNITIES
(OPIC) PROJECT IN NEW ZEALAND, FIJI, TONGA AND AUSTRALIA

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Foreword

Obesity is a major public health problem for Pacific Peoples in Aotearoa/New Zealand and the wider Pacific region. It is responsible for significant social and economic costs to individuals, families, communities and nations. Despite many local, national and regional prevention and control programmes, obesity-related disorders continue to cause major challenges and more effective interventions are needed.

The prevention and control of obesity and obesity-related disorders is one of the major public health challenges of our time. It threatens the very existence of Pacific Peoples without effective action.

The Pacific Obesity Prevention In Communities (OPIC) project is an important and unique study designed to prevent obesity. The study is conducted through a four country collaboration between The University of Auckland (Auckland), Deakin University (Melbourne), Fiji School of Medicine (Suva) and Tongan Ministry of Health (Nuku'alofa). The aim of the project is to see if community-based interventions against obesity, in multiple settings, can slow the progression of obesity.

The study is the first of its type and has the potential to help our understanding of the complex interplay between various factors in the community. While unhealthy diets and reduced physical activity levels are well known risk factors for obesity, there is limited information on the interactions between the various factors which shape availability and choice of food, and opportunities for physical activity. Challenges within the environment need to be better defined before effective interventions can be tested.

The Pacific OPIC Study also exemplifies good practice in research design and capacity building for research in the region. In addition to the study findings, investigators have identified and supported several promising young Pacific researchers in the study countries to further their careers in research. This is particularly important in the case of Fiji and Tonga where there is extreme shortage of trained researchers. Local researchers provide the continuity and communication with local communities. It is important that study findings are shared with local study participants, their families and nations. This approach will help ensure that results are retained and used locally.

Funding for the research has been provided by the New Zealand Health Research Council, National Health and Medical Research Council of Australia and the Wellcome Trust of the United Kingdom. This funding arrangement has enabled this large and complex research project to be undertaken.

I am certain that the results of this investigation will improve our understanding of the challenges posed by obesity as well as interventions that improve our chances of preventing and controlling obesity and obesity-related disorders.

Dr Colin Tukuitonga
Ministry of Pacific Island Affairs
Wellington
September 2008

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List of Abbreviations

BMI	body mass index	OPIC	Obesity Prevention In Communities
cm	centimetre	PedsQL™	Pediatric Quality of Life Inventory
kg	kilogram	SD	standard deviation
m	metre	WHO	World Health Organization
NZ	New Zealand		

Executive Summary

Background

The Pacific region has the highest rates of obesity in the world. The Pacific OPIC Project (Obesity Prevention In Communities) was established in 2004 to evaluate the effectiveness of whole-of-community obesity prevention programs for youth (ages 12-18 years) in New Zealand, Fiji, Tonga and Australia. There is limited information on the lifestyle and obesity patterns among youth in the South Pacific region. The current report aims to extend our understanding of these patterns, and how they vary across Pacific countries, by publishing information collected from students during baseline cross-sectional surveys carried out in 2005 and 2006 as part of the Pacific OPIC project. (Results from the obesity prevention programs will be published separately).

Methods

Information was collected from 17,150 high school students in Fiji (n=7237), New Zealand (n=4215), Australia (n=3163) and Tonga (n=2535). Students were surveyed at schools in each of the countries using a standard interview process and questionnaires. Information in this report includes: demographic variables, anthropometry (e.g. weight and height), perception and attitudes of body size, food and nutrition behaviours, physical activity and leisure time activities, family and home environment, school environment, neighbourhood environment, and quality of life.

Results

Body Size and Attitudes

- Approximately one-quarter of students across all four study sites were overweight (26% females; 20% males) and more than 10% were obese (12% females; 11% males).
- The prevalence of overweight/ obesity was very high in New Zealand (58% females; 59% males) and Tonga (53% females; 31% males) compared with Australia (27% females; 26% males) and Fiji (26% females; 17% males).
- In New Zealand, 26% of female and 28% of male students were obese, and 32% of female and 31% of male were overweight.
- More than 30% of Indo-Fijian students were classified as thin.
- Approximately twice as many females (15%) as males (7%) in Tonga were obese.
- Approximately half of females and one third of males across all four study sites were trying to lose weight, while 13% of females and 24% of males were trying to gain weight.

Food and Nutrition Behaviours

- More than 15% of students in New Zealand reported that they do not usually eat breakfast.
- Female students were more likely to skip breakfast than male students in Fiji and Australia.
- The school canteen/ tuckshop was the primary source of lunch for most students in Tonga and nearly half of students in New Zealand. Students from Fiji and Australia were most likely to bring their lunch from home.
- More than half of all students consume at least two servings of fruit and two servings of vegetables each day.
- Nearly 20% of students ate takeaways/ fast food two or more times per week.
- Approximately 30% of students in New Zealand, Fiji, and Tonga drank soft drinks on 4 or 5 days in the past five school days.

Physical Activity and Leisure Time Activities

- Males were more likely than females to engage in physical activities (i.e., running around) during the morning and lunchtime breaks during the school day.
- Multiple opportunities exist for increasing physical activity during the school day, yet less than one-third of students played actively during morning and lunchtime breaks.
- Approximately two-thirds of students did physical activities after school on 3 or fewer of the previous five school days.
- Nearly 40% of students in New Zealand spent 2 or more hours per day watching television, compared with approximately one-quarter of students in Fiji and Australia and 15% in Tonga.

Family and Home Environment

- Nearly two-thirds of students ate a meal with their family on 4 or 5 of the previous five school days.
- Only 50% of students in Tonga reported having fruit available to eat at home most of the time, and across all four countries nearly 50% of students had potato crisps/chips available to eat at home most of the time.
- Approximately half of students reported a lot of parental support for physical activity.
- Almost all students reported having a television at home, but more than 50% of students in New Zealand have a television in their bedroom.
- Nearly all students in Tonga and Fiji reported that their parents restricted their television use, compared with only about half of students in New Zealand and Australia.

School Environment

- More than two-thirds of students in Fiji and Tonga considered their teachers to be good role models for healthy eating and physical activity.
- Fewer than 30% of students reported that the food and drinks available at school were mostly healthy.
- Approximately 60% of students in New Zealand, Fiji and Tonga thought their school provided a lot of support for all students to play organized sports.

Neighbourhoods and Communities

- A high proportion of students reported feeling safe in their neighbourhoods at night, but females were less likely to report feelings of safety than males.
- Approximately 60% of students in Tonga reported being bothered by dogs and traffic when walking in their neighbourhoods.
- Approximately one-quarter of students reported being bothered by other people when walking in their neighbourhoods.

Quality of Life Indicators

- Across the multiple dimensions of health, a high proportion of students in Fiji and Tonga reported difficulties with many indicators of quality of life.
- Males were more likely to report higher quality of life indicators in the dimensions of physical functioning (such as difficulties walking, running, playing sport, low energy and emotional functioning (such as feeling scared, sad, angry, worried) than females.
- Many of the Indigenous students in Fiji reported difficulties with tasks (such as keeping up with school work, getting along with other teenagers) within the social functioning and school functioning dimension of health.

Conclusions

There are large variations in obesity levels across the four countries, indicating that the different environments, including socio-cultural environments, are a contributing factor to obesity.

- **The wider community has a role in preventing youth obesity by creating environments that:**
 - support healthy eating by limiting the availability and promotion of foods and drinks known to increase obesity.
 - increase the opportunities for after-school and weekend physical activity by youth.
- **The education system and schools have a role in preventing youth obesity by:**
 - providing opportunities for more structured physical activity by students at school.
 - increasing the healthiness of food sold in school canteens.
- **Families have a role in preventing youth obesity by:**
 - encouraging their children to eat a regular, healthy breakfast.
 - limiting the availability of snack foods and sugary drinks in the homes.
 - limiting the amount of money given to youth to spend on unhealthy foods.
 - increasing the availability of fresh fruit and healthier food choices.
 - limiting the time spent by their children watching television.

Introduction

Overweight and obesity are the 7th leading predicted cause of avoidable global disease burden for 2010 and 2020 (World Health Organization, 2002), with prevalence rates rapidly increasing in both developed and developing countries (World Health Organization, 2000a). It is of serious concern that the Pacific region has the highest rates of obesity in the world (Coyne, 2000; Hodge et al., 1995) and Pacific populations living in New Zealand are at the extreme end of the global spectrum with over 80% of adults and over 60% of children aged 5-14 years being overweight or obese (Parnell et al., 2003; Russell et al., 1999). While Pacific children living in the Pacific have a lower prevalence of overweight and obesity compared to their New Zealand counterparts (Fukuyama et al., 2005), after they leave school, they have a rapid weight increase of averaging about 25kg over 10 years – about 10-15 kg from the age-related changes between 20 and 30 years of age, plus about another 10 kg from the secular trends of whole population weight gain of about 1 kg/year (Coyne, 2000; Ministry of Health (Fiji), 2002). The current and future burdens of diabetes, cardiovascular diseases, and other obesity-related diseases for Pacific populations are enormous (Tobias et al., 2005; World Health Organization, 2003) and warrant a serious investment in prevention.

Obesity prevention has indeed been recognised as a high priority by the World Health Organization (World Health Organization, 2002), successive Pacific Health Forums and other Pacific Consultations (World Health Organization, 2000b, 2001), and by Australian and New Zealand health authorities for at least the last 10 years (Healthy Weight Australia: A National Obesity Strategy, 1995; Ministry of Health (New Zealand), 2003; National Health and Medical Research Council, 1997; National Obesity Taskforce, 2003). However, it is only recently that governments have been seeking evidence on what does and does not work for obesity prevention; and unfortunately this current evidence base is very limited. Systematic reviews of the literature have identified less than 30 intervention studies to prevent childhood or adolescent obesity (Doak et al., 2006; Summerbell et al., 2005). Most studies have been conducted in primary schools, have been short term and have had modest results at best. Much more intervention research is required, especially for highly susceptible populations.

For these reasons, the Pacific OPIC Project (Obesity Prevention In Communities) was established to measure the effectiveness and cost-effectiveness of whole-of-community obesity prevention programs for youth (ages 12-18 years) in New Zealand, Fiji, Tonga and Australia. In addition to evaluating the intervention programs, several socio-cultural, economic and policy research sub-studies informed the interventions at the community and population levels. The Pacific OPIC Project was funded for five years by three research funding bodies: the Wellcome Trust (UK), the National Health and Medical Research Council (Australia), and the Health Research Council (New Zealand) as part of an International Collaborative Research Grants scheme.

The Pacific OPIC Project objectives included: evaluating the effectiveness and cost-effectiveness of the interventions; identifying the important socio-cultural factors related to food, physical activity and body size perception; estimating the economic burdens (including loss of quality of life) of obesity; analysing the food policy options for Fiji and Tonga that might contribute towards reducing chronic diseases, and; building the capacity for Pacific research in the area of obesity prevention. This has been a very ambitious set of objectives, particularly given the existing low research capacity in the Pacific, the complexity of the tasks, and the short timelines needed to achieve whole-of-community action and cultural change. Nevertheless, an enormous team effort across four countries has successfully conducted baseline measurements on over 17,000 students, implemented multi-strategy interventions in the four communities over three years,

completed the follow up measurements, undertaken the many sub-studies, and trained up a significant research workforce. The scale of engagement with schools, communities, governments, churches and other stakeholders has been huge and has already paid dividends, with experiences gained from the studies being applied more broadly in each of the countries.

The purpose of this report is to present the baseline data collected from the 17,000 students in 2005 and 2006. It contains very valuable comparative data on the demographics, anthropometry and body size perceptions, food and eating patterns, physical activity and sedentary behaviour patterns, quality of life, and student perceptions of the home, school, and neighbourhood environments. This type of information is enormously useful in planning for interventions and deciding which behaviours, attitudes and environmental factors should be given priority. The comparative nature of the data is also very useful. Some behaviours and environmental factors show very wide variations and these could be potential areas for targeted interventions because it is known that healthier patterns are possible in other communities. It is hoped that the comprehensive data in this report, the forthcoming follow up data, and the findings from the socio-cultural, economic and policy studies from the Pacific OPIC Project will provide rich, informative information to direct community efforts to reduce unhealthy weight gain in youth, especially within Pacific populations.

Demographic Characteristics

Introduction

In New Zealand, four high schools in Mangere, in South Auckland (intervention area) and three other comparison schools (matched for ethnic and socio-economic background of students) from South Auckland were involved in the survey. All students in Years 9-13 (Year 13 is the final school year in New Zealand) attending these schools were invited to participate. The students come from communities that are socio-economically disadvantaged compared to the rest of New Zealand, although the Pacific Island students are likely to be representative of Pacific youth in New Zealand.

In Fiji, eight high schools in the peri-urban area of Nasinu near Suva (intervention area) and eleven comparison schools (matched for ethnic mix) situated in towns on the other (west) side of the main island of Viti Levu were involved in the survey. All students in Forms 3-6 (Form 7 is the final school year in Fiji) attending these schools were invited to participate.

In Tonga, three intervention districts on the main island of Tongatapu (Kolonga, Nukunuku, and Houma) and three comparison high schools on the northern island group of Vava'u were involved in the survey. All students in Forms 1-6 (Form 7 is the final school year in Tonga) who lived in the intervention districts or who were attending the comparison schools were invited to participate.

In Australia, five high schools in East Geelong (intervention area) and seven comparison schools which were selected from a stratified (by size), random selection of schools across the rest of the Barwon-South Western region of Victoria were involved in the survey. All students in Years 7-11 (Year 12 is the final school year in Australia) attending these schools were invited to participate. The Barwon-South Western region (population ~320,000) is one of nine regions in Victoria and it covers the south-west part of the state across to the South Australia border. It is socio-economically disadvantaged compared to the rest of Victoria. Twelve percent of the population was born overseas, making it predominantly an Australian European population. Geelong is the major regional city (population ~200,000) with the remainder of the population living in small towns or rural areas.

The demographic characteristics of each study site are summarized in Table 1.

New Zealand

In New Zealand, 4215 students participated in the survey. The study sample comprised more females (52%) than males (48%) and 84% of students were between the ages of 13 and 16 years (52% aged 13 to 14; 32% aged 15 to 16). Correspondingly, most students were in school Years 9, 10 or 11. In the New Zealand sample, 59% of students identified their ethnicity as Pacific Island, 20% of students were Māori, 11% of students were Asian, and 11% of students were European. Most students (92%) were living with at least one parent during the school week. Nearly 40% of students report having 7 or more people living at home (Figure 1); Pacific students (48%) and Māori students (34%) were most likely to report living in households of this size.

Fiji

In Fiji, 7237 students participated in the survey. The study sample comprised more females (53%) than males (47%) and 84% of students were between the ages of 13 and 16 years (41% aged 13 to 14; 43% aged 15 to 16). Approximately 50% of students were in Year 9 and 35% of students were in Year 11 at school. In the Fiji sample, 43% of students identified their ethnicity as Indigenous, 52% as Indo-Fijian, and 5% as another ethnicity (Other). Nearly 90% of students were living with at least one parent during the school week; Indo-Fijian students (96%) were the most likely to live with their parents. Approximately 30% of students reported having 7 or more people living at home; Indigenous students (45%) were more likely to live in households of this size than Indo-Fijian students (17%).

Tonga

In Tonga, 2535 students participated in the survey. The study sample comprised more females (55%) than males (45%) and 64% of students were between the ages of 13 and 16 years (33% aged 13 to 14; 31% aged 15 to 16). Students from Forms 1 and 2 were included in the Tonga survey in order to achieve sufficient sample sizes. Nearly 90% of students were living with at least one parent during the school week; nearly 50% reported that other adult relatives were living in their home during the school week. Most students (60%) reported living in households with 7 or more people.

Australia

In Australia, 3163 students participated in the survey. The study sample comprised more males (56%) than females (44%) and 81% of students were between the ages of 13-16 years (47% aged 13 to 14; 34% aged 15 to 16 years). As the schools participating in the Australian study serve a population of students who are predominately Australian-born of European descent, students were not asked specific questions about ethnicity. Almost all students (98%) reported that they were living with at least one parent during the school week and few students (6%) live with other adult relatives during the school week. More than half of students (57%) were living in households with 1 to 4 people and only 5% reported households with 7 or more people.

Figure 1. Number of people living at home by country

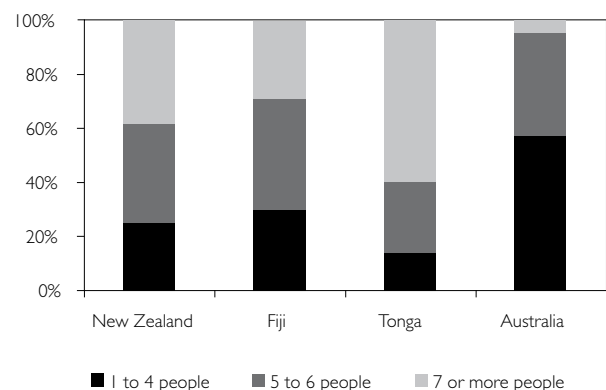


Table 1. Demographic characteristics of students in each study site

	New Zealand					Fiji				Tonga	Australia	All four countries
	Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
Total (n)¹	2490	834	446	445	4215	3104	3767	366	7237	2535	3163	17150
	%	%	%	%	%	%	%	%	%	%	%	%
Gender												
Female	52	51	52	51	52	55	51	58	53	55	44	49
Male	48	49	48	49	48	46	49	42	47	45	56	51
Age												
12 yrs and younger	4	4	3	1	4	0	0	0	0	17	14	6
13 to 14 yrs	54	58	44	43	52	37	43	48	41	33	47	44
15 to 16 yrs	31	29	34	42	32	41	46	39	43	31	34	37
17 yrs and older	11	10	19	14	12	22	11	13	16	19	5	13
School year (NZ equivalent)												
Year 7 (Ton Form 1)										13		2
Year 8 (Ton Form 2)										19		3
Year 9 (Aus yr 7, Ton Form 3)	37	38	28	27	35	52	47	57	49	21	27	37
Year 10 (Aus yr 8, Ton Form 4)	22	24	21	23	22	7	11	5	9	18	23	17
Year 11 (Aus yr 9, Ton Form 5)	18	17	21	25	19	37	34	35	35	21	22	26
Year 12 (Aus yr 10, Ton Form 6)	14	13	15	14	14	4	8	2	7	7	18	11
Year 13 (Aus yr 11, Ton Form 7)	10	8	14	12	10	0	1	0	0	1	10	5
Living with one or two parents during school week												
	91	90	97	95	92	79	96	87	89	87	98	91
Living with other adult relatives during school week												
	42	35	26	18	37	55	26	46	39	49	6	33
Number of people living at home												
1 to 4 people	16	31	39	52	25	19	38	29	30	14	57	32
5 to 6 people	36	36	44	37	37	36	45	37	41	27	38	38
7 or more people	48	34	17	11	38	45	17	34	29	60	5	30
¹ Note that sample sizes for subsequent tables are smaller due to some missing data												

Body Size and Attitudes

Students in all four countries were weighed and measured for height and waist circumference using standardized procedures and protocols. Height and weight measurements were used to generate body mass index (BMI) by dividing weight (kg)/ height (m)². BMI is an internationally recognized measure of body size for populations. BMI measurements were used to classify students as thin, healthy weight, overweight or obese based on gender age-specific recommendations made by the International Obesity Taskforce (Cole et al., 2000; Cole et al., 2007).

Waist circumference is another indicator associated with adiposity and increased disease risk; some researchers have suggested that disease risk is lowest when an individual's waist circumference is less than half of their height (Freedman et al., 2007; Kahn et al., 2005). Therefore, the waist-to-height ratio is defined as healthy in this report if it is less than 0.5.

Key points

- Approximately one-quarter of students across all four study sites were overweight (26% females; 20% males) and more than 10% were obese (12% females; 11% males).
- The prevalence of overweight/ obesity was very high in New Zealand (58% females; 59% males) and Tonga (53% females; 31% males) compared with Australia (27% females; 26% males) and Fiji (26% females; 17% males).
- In New Zealand, 26% of female and 28% of male students were obese, and 32% of female and 31% of male were overweight.
- More than 30% of Indo-Fijian students were classified as thin.
- Approximately twice as many females (15%) as males (7%) in Tonga were obese.
- Approximately half of females and one third of males across all four study sites were trying to lose weight, while 13% of females and 24% of males were trying to gain weight.

Body size

Approximately one-quarter of students across all four study sites were overweight (26% females; 20% males) and more than 10% were obese (12% females; 11% males)(Table 2, Table 3, Table 4).

By country

More than one-quarter of students in New Zealand (26% females; 28% males) were obese compared with approximately 10% of students in Tonga (15% females; 7% males), Australia (6% females; 7% males) and Fiji (6% females; 4% males) (Figure 2). In contrast, approximately 20% of students in Fiji (17% females; 21% males) were classified as thin compared with fewer than 5% of students in New Zealand, Australia and Tonga. Correspondingly, the mean waist circumference was highest in New Zealand (86cm females; 86cm males) compared with Fiji, Tonga and Australia. A similar pattern was observed for BMI score, weight, and waist-to-height ratio. More than three-quarters of students in Fiji (76% females; 89% males) and Australia (71% females; 79% males) had a waist-to-height ratio within a healthy range (<0.5) compared with approximately 50% of students in New Zealand (49% females; 53% males).

By gender and ethnicity

In Tonga, the prevalence of obesity was significantly higher among females (15%) than males (7%); few differences in obesity by gender were observed in Fiji, New Zealand or Australia. Ethnic differences in the prevalence of overweight/obesity were observed in Fiji and New Zealand. In Fiji, the Indigenous students were most likely to be overweight/obese (39% females; 22% males) while the Indo-Fijian students were most likely to be thin (31% females; 35% males) (Figure 3). In New Zealand, the proportion overweight/obese was highest in Pacific students (females: 32% obese, 36% overweight; males: 36% obese, 35% overweight), followed Māori (females: 23% obese, 30% overweight; males: 24% obese, 30% overweight), European (females: 11% obese, 26% overweight; males: 14% obese, 21% overweight), and Asian students (females: 7% obese, 21% overweight; males: 9% obese, 22% overweight).

Figure 2. Prevalence of overweight and obesity by country - Females

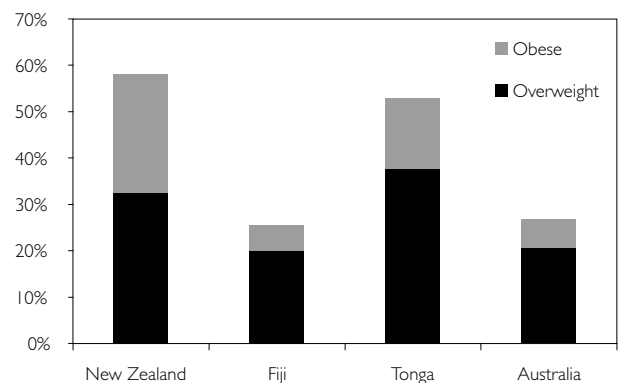
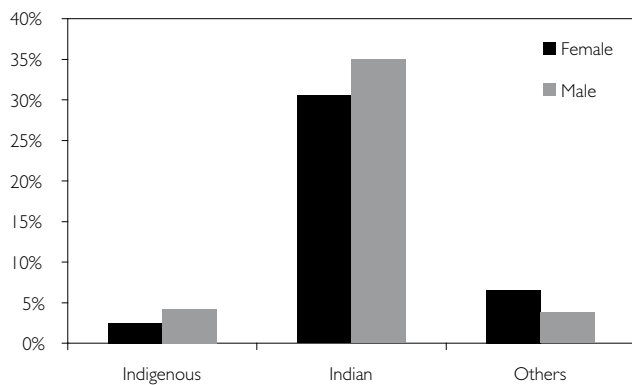


Figure 3. Prevalence of thinness by ethnicity – Fiji



Weight perception and satisfaction

Among the females, about half (49%) perceived themselves to be about the right weight, but only 39% of females were happy with their body weights. For males, about half (55%) perceived themselves to be about the right weight and half were happy with their body weights (54%) (Table 5).

By country

Nearly 60% of students from Australia (59% females; 60% males) and Fiji (53% females; 62% males) perceived themselves as being about the right weight, compared with approximately 40% of students in New Zealand (42% females; 44% males) and Tonga (38% females; 47% males). Similarly, approximately half of students in Australia (41% females; 62% males) and Fiji (42% females; 59% males) were happy with their body weight.

By gender and ethnicity

Within each country, females were more likely than males to perceive themselves as overweight and less likely to be happy with their body weights. In New Zealand, approximately 40% of Pacific students (44% females; 40% males) and Māori students (41% females; 37% males) perceived themselves as overweight compared with approximately 30% of Asian students (36% females; 29% males), and European students (37% females; 24% males). In contrast, approximately 40% of Pacific students, Māori students and Asian students were happy with their body weight, compared with less than 20% of European students (15% females; 19% males).

Weight control behaviours

Approximately half of females and one third of males were trying to lose weight, while 13% of females and 24% of males were trying to gain weight.

By country

More than 50% of students from New Zealand reported that they were trying to lose weight (59% females; 48% males) compared with approximately 40% of students in Fiji (49% females; 32% males), Tonga (45% females; 32% males), and Australia (44% females; 23% males) (Figure 4). More than 80% of male students in Fiji and 70% of male students in Australia were trying to gain muscle.

By gender and ethnicity

Within each country, more females than males reported that they were trying to lose weight, while more males than females were trying to gain muscle.

Figure 4. Proportion of students trying to lose weight by country and gender

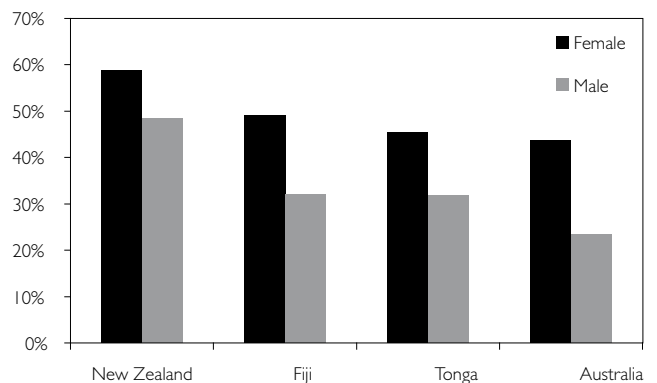


Table 2. Weight classification and weight-to-height ratio cutpoints

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	%
Weight classification													
Female	Thin	0	2	14	5	2	3	31	7	17	1	4	9
	Healthy Weight	31	45	58	58	39	59	56	64	58	46	69	53
	Overweight	36	30	21	26	32	31	10	22	20	38	21	26
	Obesity	32	23	7	11	26	8	3	8	6	15	6	12
Male	Thin	0	1	12	3	2	4	35	4	21	1	2	10
	Healthy Weight	29	45	58	63	39	75	51	65	62	67	72	59
	Overweight	35	30	22	21	31	18	9	23	13	24	19	20
	Obesity	36	24	9	14	28	4	4	9	4	7	7	11
Waist to height ratio <0.5 (healthy)													
Female		41	56	67	68	49	67	83	73	76	51	71	64
Male		46	58	69	72	53	93	87	82	89	85	79	78

Table 3. Height, weight, BMI and BMI-z score measurements

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	%
Height													
Female	mean	166.9	166.3	162.3	166.2	166.2	162.2	156.4	160.9	159.2	162.0	161.4	161.8
	SD ¹	8.1	8.1	8.1	8.7	8.3	5.6	5.8	5.7	6.4	6.6	7.1	7.6
Male	mean	169.4	168.0	164.1	167.1	168.3	169.5	166.2	170.4	167.7	166.6	167.4	167.6
	SD	8.2	9.0	8.6	9.1	8.7	8.3	8.2	7.8	8.4	11.0	10.5	9.3
Weight													
Female	mean	75.7	69.9	57.9	64.4	71.5	62.4	48.8	58.8	55.4	65.1	57.4	61.3
	SD	19.4	18.0	15.3	15.2	19.3	11.7	11.0	12.4	13.2	14.5	11.8	16.4
Male	mean	77.5	70.7	58.4	63.5	72.6	63.4	53.7	66.0	58.3	63.1	61.0	63.0
	SD	19.6	19.4	14.1	15.8	19.8	13.1	13.7	15.8	14.4	16.2	14.2	17.1
BMI													
Female	mean	27.0	25.1	21.8	23.2	25.7	23.7	19.9	22.7	21.7	24.6	22.0	23.2
	SD	5.9	5.5	4.8	4.4	5.9	3.9	4.0	4.4	4.4	4.6	3.9	5.1
Male	mean	26.9	24.9	21.6	22.6	25.4	21.9	19.3	22.6	20.5	22.4	21.5	22.2
	SD	5.9	5.8	4.4	4.5	5.9	3.4	4.1	4.6	4.1	3.8	3.7	4.9
BMI-z score													
Female	mean	1.35	1.07	0.25	0.63	1.11	0.70	-0.43	0.48	0.12	0.98	0.45	0.56
	SD	0.75	0.84	1.12	0.93	0.91	0.77	1.30	0.94	1.18	0.74	0.86	1.1
Male	mean	1.46	1.12	0.22	0.58	1.17	0.31	-0.77	0.44	-0.27	0.61	0.42	0.34
	SD	0.80	0.93	1.27	1.02	1.00	0.89	1.50	1.11	1.36	0.80	0.90	1.26

¹ Standard deviation of the mean

Table 4. Waist circumference and waist-to-height ratio

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	
Waist circumference													
Female	mean	89	85	78	81	86	79	71	76	74	82	77	79
	SD ¹	15	15	13	13	15	18	9	9	14	10	10	12
Male	mean	90	85	78	81	86	75	72	78	74	77	78	78
	SD	28	15	11	12	15	8	11	11	10	9	11	12
Waist to height ratio													
Female	mean	0.53	0.51	0.48	0.49	0.52	0.48	0.45	0.47	0.47	0.50	0.48	0.48
	SD	0.08	0.08	0.07	0.07	0.08	0.11	0.06	0.06	0.09	0.06	0.06	0.07
Male	mean	0.53	0.51	0.47	0.48	0.51	0.44	0.43	0.46	0.47	0.46	0.47	0.47
	SD	0.15	0.09	0.07	0.07	0.09	0.04	0.06	0.06	0.06	0.05	0.06	0.07

¹ Standard deviation of the mean

Table 5. Weight perceptions and weight control behaviours

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	
Weight perception													
Female	Underweight	16	13	25	15	16	21	24	17	22	12	12	17
	About the right weight	40	47	39	48	42	51	55	53	53	38	59	49
	Overweight	44	41	36	37	42	28	20	30	24	49	29	34
Male	Underweight	19	19	24	19	19	21	24	18	23	17	19	20
	About the right weight	41	44	47	57	44	62	62	61	62	47	60	55
	Overweight	40	37	29	24	37	17	15	22	16	35	22	26
Happy or very happy with body weight													
Female		35	41	36	15	36	44	41	33	42	33	41	39
Male		43	46	42	19	44	62	57	53	59	44	62	54
Happy or very happy with body shape													
Female		37	40	35	33	37	52	48	41	50	40	38	43
Male		43	43	44	48	43	65	62	56	62	48	59	55
Weight control behaviours													
Female	Trying to lose weight	61	53	46	67	59	56	43	47	49	45	44	48
	Trying to gain weight	6	4	0	0	5	19	27	18	22	6	3	13
	Not trying to change weight	33	44	54	33	37	26	31	35	29	49	53	39
Male	Trying to lose weight	53	35	42	47	48	38	27	35	32	32	23	34
	Trying to gain weight	14	21	16	12	15	36	45	27	40	16	14	24
	Not trying to change weight	34	44	42	41	37	26	29	38	28	53	63	43
Trying to gain muscle													
Female		53	50	44	44	51	48	30	52	39	27	25	38
Male		64	64	62	57	63	82	85	87	84	46	73	71

Food and Nutrition Behaviours

Healthy eating is a key component of a healthy lifestyle. Good nutrition ensures that young people maintain a healthy body weight, prevent chronic diseases later in life and have a lot of energy to optimize their sports performance and do well in school. Healthy eating is associated with increased life expectancy, increased quality of life and decreased risk of cardiovascular disease, cancer and diabetes. (Lobstein et al., 2004)

This survey asked young people about some of their eating behaviours and habits. Students were asked about their consumption of fruits and vegetables and breakfast because these behaviours are associated with health benefits that extend into adulthood. (Haines et al., 2007) Students were asked several questions about consuming foods prepared away from home because foods purchased outside the home generally make it difficult for young people to eat well. Foods prepared away from home (such as fast foods, snack foods, convenience foods) tend to have a lot of energy (kilojoules or calories), fat, saturated fat, and/or sugar but few fruits and vegetables. (Guthrie et al., 2002) Students were also asked about their consumption of sweet drinks (soft drinks, fruit drinks) because frequent consumption of these drinks lead to excessive weight gain over time. (Malik et al., 2006; Taylor et al., 2005).

Key points

- More than 15% of students in New Zealand reported that they do not usually eat breakfast.
- Female students were more likely to skip breakfast than male students in Fiji and Australia.
- The school canteen/ tuckshop was the primary source of lunch for most students in Tonga and nearly half of students in New Zealand. Students from Fiji and Australia were most likely to bring their lunch from home.
- More than half of all students consumed at least two servings of fruit and two servings of vegetables each day.
- Nearly 20% of students ate takeaways/ fast food two or more times per week.
- Approximately 30% of students in New Zealand, Fiji, and Tonga drank soft drinks on 4 or 5 days in the past five school days.

Source of foods consumed for breakfast

More than 80% of students reported that they usually got the foods they ate for breakfast from home. Across the four study sites, 10% of females and 7% of males reported that they did not usually eat breakfast (Table 6).

By country

Almost all students in Fiji (89% females; 94% males) and Australia (87% females; 93% males) usually got the foods they ate for breakfast from home compared with approximately 70% of students in Tonga (72% females; 73% males) and New Zealand (67% females; 68% males). Approximately 20% of students in Tonga (21% females; 21% males) and New Zealand (16% females; 17% males) usually bought their breakfast from the school canteen or a shop outside the school. Students from New Zealand (16% females; 16% males) and Australia (12% females; 6% males) were the most likely to report that they did not eat breakfast (Figure 5).

By gender and ethnicity

In New Zealand, nearly 80% of European students (80% females; 75% males) and Asian students (75% females; 82% males) usually sourced their breakfast foods from home compared with approximately two-thirds of Pacific students (64% females; 64% males) and Māori students (67% females; 67% males) (Figure 6). Few ethnic differences in sourcing breakfast from home were noted for the ethnic populations of Fiji.

Gender differences for not eating breakfast were most pronounced for students from Australia (12% females; 6% males) and Fiji (7% females; 3% males) where females were more likely to skip breakfast than males.

Frequency of breakfast consumption over past 5 school days

This section includes only those students who reported that they usually ate breakfast in the question above (n=13,995). In the combined sample, 70% of females and 75% of males who usually eat breakfast, did so on 4 or 5 of the previous five school days.

By country

Nearly 90% of students in Australia (86% females; 88% males) and 80% of students in Fiji (72% females; 80% males) ate breakfast on 4 or 5 of the past five school days, compared with approximately 60% of students from Tonga (66% females; 62% males) or New Zealand (57% females; 59% males).

By gender and ethnicity

In Fiji, male students (80%) were more likely than female students (72%) to eat breakfast on 4 or 5 of the past five school days. Few other gender differences were noted within the other countries. Ethnic differences in breakfast consumption for both Fiji and New Zealand were observed. In New Zealand, approximately three-quarters of European students (74% females; 78% males) and Asian students (73% females; 76% males) ate breakfast on 4 or 5 of the previous five school days, compared with approximately 50% of Pacific students (52% females; 53% males) and Māori students (53% females; 56% males).

Figure 5. Proportion of students who don't usually eat breakfast by country and gender

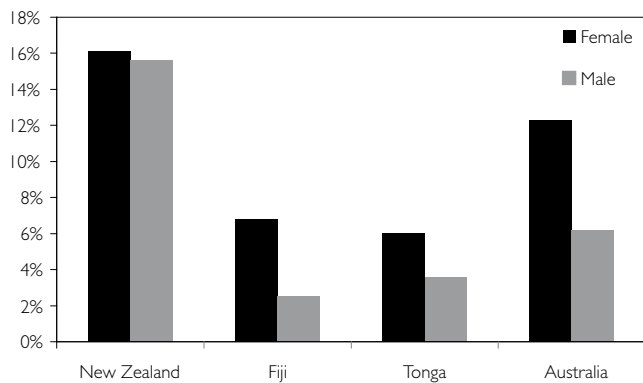
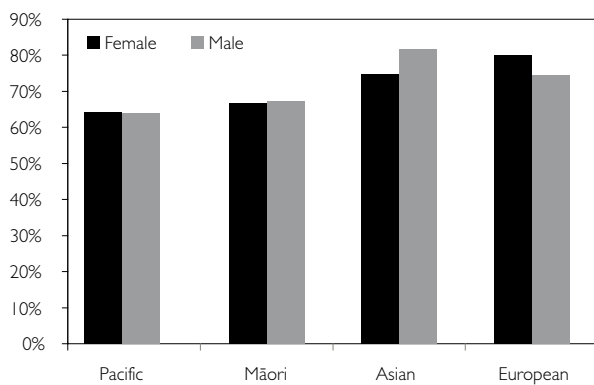


Figure 6. Proportion of students who usually get their breakfast foods from home by ethnicity and gender – New Zealand



Source of foods consumed for morning tea

The most common sources of foods consumed for morning tea on school days were the school canteen (49% females; 40% males) and home (38% females; 47% males). Fewer than 5% of students reported that they usually bought their morning tea from a shop outside of school (Table 7).

By country

Most students from Australia (87% females; 88% males) ate foods for morning tea that came from home, while very few students from Tonga (5% females; 9% males) did so. A high proportion of students from Tonga (74% females; 67% males) and Fiji (62% females; 50% males) bought their morning tea from the school canteen (Figure 8). Approximately 10% of students from New Zealand did not usually eat morning tea (11% females; 11% males).

By gender and ethnicity

In New Zealand and Australia, few gender differences were observed from where students sourced their morning tea. In Fiji and Tonga, males were more likely to bring their morning tea from home, while females were more likely to buy their morning tea from the school canteen. In New Zealand, nearly 60% of European students (61% females; 59% males) and more than 50% of Asian students (48% females; 58% males) brought their morning tea from home, while more than 40% of Pacific students (48% females; 45% males) and Māori students (42% females; 42% males) bought their morning tea from the school canteen. In Fiji, a high proportion of Indo-Fijian students (38% females; 53% males) brought their morning tea from home, while approximately 70% of Indigenous students (73% females; 62% males) bought their morning tea from the school canteen (Figure 8).

Frequency of morning tea consumption over past 5 school days

This section includes only those students who reported that they usually ate morning tea in the question above (n= 14,365). Approximately 70% of students who usually eat morning tea did so on 4 or 5 of the past five school days.

By country

Approximately nine out of ten students in Australia (88% females; 92% males) ate during morning tea on 4 or 5 of the previous five school days, compared with fewer than 70% of students in New Zealand, Fiji, and Tonga.

By gender and ethnicity

Few gender differences in the frequent consumption of morning tea were observed for students in New Zealand and Australia. In Fiji, males (67%) were more likely to regularly eat at morning tea than females (62%). Few ethnic differences were noted in New Zealand; in Fiji, approximately 70% of Indo-Fijian students (67% females; 72% males) ate during morning tea most of the previous five school days, compared with approximately 60% of Indigenous students and students of Other ethnicities.

Figure 7. Main sources of morning tea among females by country

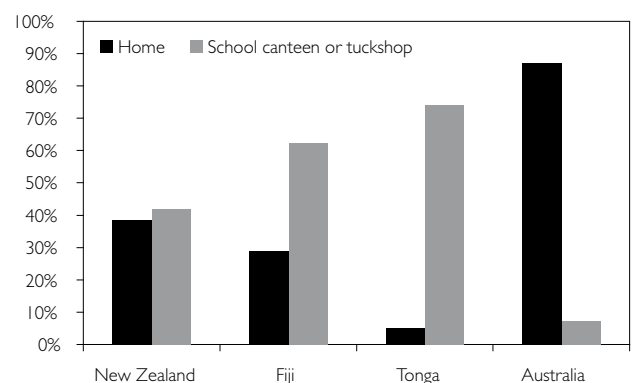
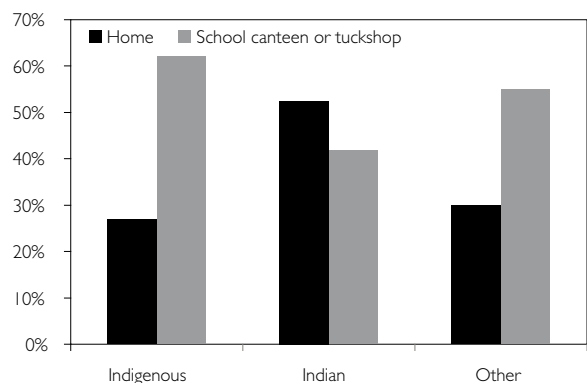


Figure 8. Main sources of morning tea by gender and ethnicity – Fiji



Source of foods consumed for lunch

The most common sources of foods consumed for lunch on school days were home (59% females; 65% males) and the school canteen (30% females; 26% males). Few students reported that they usually bought their lunch from a shop outside of school (5% females; 4% males) or that they did not usually eat lunch (7% females; 5% males) (Table 8).

By country

In Fiji (82% females; 89% males) and Australia (85% females; 86% males), most students brought the food they consumed for lunch from home. In contrast, a high proportion of students from Tonga bought their lunch from the school canteen (72% females; 65% males). In New Zealand, nearly half of students bought their lunch from the school canteen (49% females; 46% males) while approximately one-third of students (35% females; 37% males) brought their lunch from home (Figure 9).

By gender and ethnicity

Within each country, few gender differences in the source of foods consumed for lunch were noted. In New Zealand, nearly 60% of European students (58% females; 60% males) brought their lunch foods from home compared with fewer than 30% of Pacific students (27% females; 28% males). Conversely, more than half of Pacific students in New Zealand bought their lunch from the school canteen (55% females; 53% males) (Figure 10). In Fiji, few ethnic differences in sources of lunch were noted.

Frequency of lunch consumption over past 5 school days

This section includes only those students who reported that they usually ate lunch in the question above (n=15,033). Approximately three-quarters of students who usually eat lunch did so on 4 or 5 of the previous five school days.

By country

Most students from Australia (85% females; 91% males), Fiji (73% females; 81% males), and Tonga (77% females; 70% males) ate lunch on 4 or 5 of the previous five school days, compared with approximately two-thirds of students in New Zealand.

By gender and ethnicity

Few gender differences in lunch consumption were observed in New Zealand, but in Fiji and Australia males (81% Fiji; 91% Australia) were more likely to eat lunch on most of the previous five school days than females (73% Fiji; 85% Australia). In Tonga, females were more likely to regularly eat lunch than males (77% females; 70% males). Few ethnic differences in frequency of lunch consumption were observed in New Zealand and Fiji.

Figure 9. Main sources of lunch by country – Females

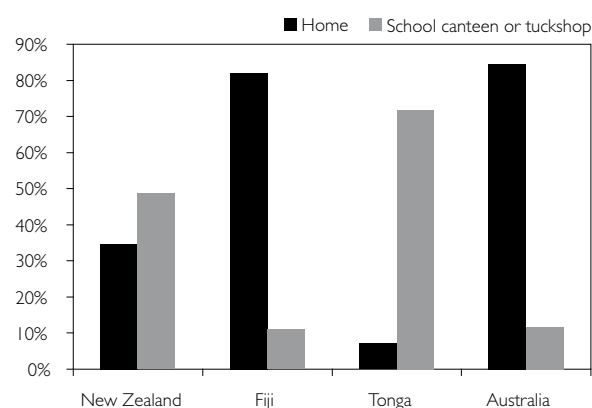
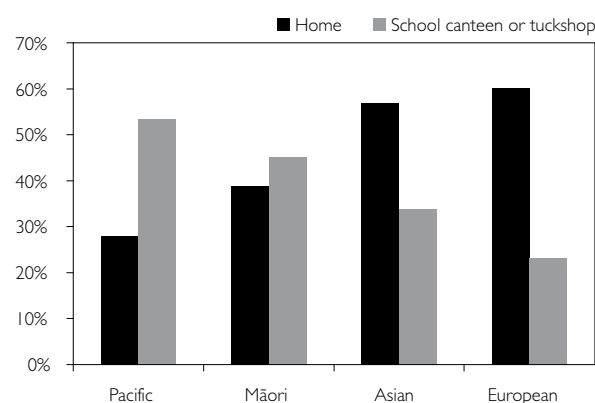


Figure 10. Main sources of lunch by ethnicity – New Zealand



Fruit and vegetable consumption

Approximately half of all students reported that they usually eat at least two servings of fruit (50% females; 51% males) or vegetables (54% females; 59% males) everyday (Table 9).

By country

Fewer than 40% of students in Fiji (35% females; 37% males) ate fruit at least two or more servings of fruit per day compared with approximately 60% of students in New Zealand, Tonga, and Australia. More than three-quarters of students in Australia (76% females; 77% males) consumed at least two vegetables per day compared with approximately 60% of students in New Zealand (63% females; 60% males), Fiji (52% females; 61% males), and Tonga (64% females; 67% males).

By gender and ethnicity

Within each of the four countries, few gender differences in fruit and vegetable consumption were observed, except in Fiji where a higher proportion of males (61%) usually ate 2 or more vegetables per day than females (52%). In New Zealand, nearly two-thirds of Pacific students (65% females; 64% male) ate 2 or more servings of fruit per day, compared with approximately 50% of Māori students (58% females; 56% males), Asian students (46% females; 49% males) and European students (56% females; 50% males) (Figure 11). Nearly 70% of European students ate 2 or more servings of vegetables per day (73% females; 68% males). In Fiji, more than 40% of Indigenous students (41% females; 42% males) and students from Other ethnicities (41% females; 47% males) ate 2 or more servings of fruit per day, compared with one-third of Indo-Fijian students (29% females; 33% males).

Consumption of takeaway foods

Nearly 20% of students reported usually eating takeaway foods at least twice a week (19% females; 17% males). Approximately 10% of students reported that they usually eat takeaways for dinner more than once a week.

By country

Approximately 40% of students from Tonga (44% females; 35% males) and one-quarter of students from New Zealand (25% females; 25% males) ate takeaway food two or more times per week, compared with 10% of students from Fiji (13% females; 13% males) and 5% of students from Australia (5% females; 6% males) (Figure 12). Similarly, more than 20% of students from Tonga and 15% of students from New Zealand usually ate takeaways for dinner more than once a week.

By gender and ethnicity

Few gender differences in the consumption of takeaway foods within each country were observed. In New Zealand, nearly 30% of Pacific students (28% females; 28% males) and Māori students (29% females; 27% males) usually ate takeaway foods at least twice a week. In Fiji, more than 15% of Indigenous students (17% females; 15% males) usually ate takeaway foods at least twice a week, compared with 10% of Indo-Fijian students (10% females; 12% males) and students of Other ethnicities (9% females; 9% males).

Figure 11. Proportion of students consuming 2 servings of fruit per day by ethnicity – New Zealand

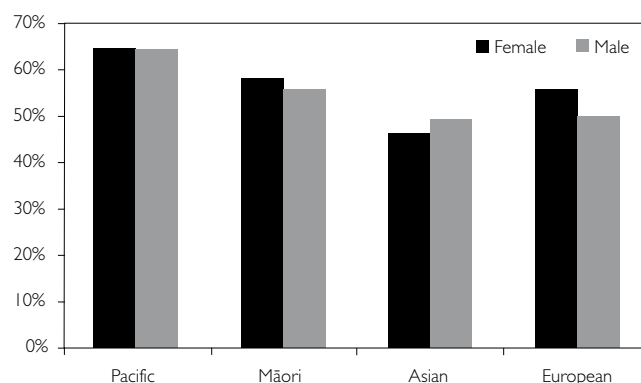
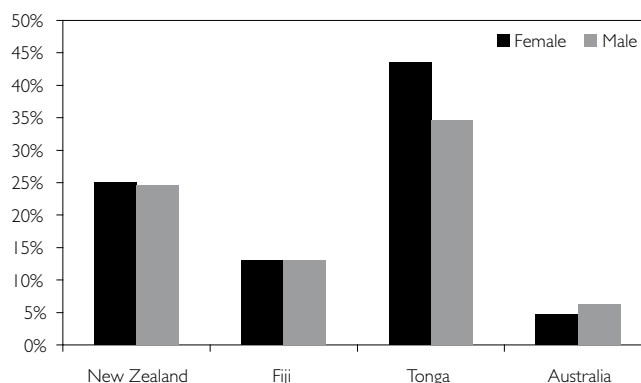


Figure 12. Proportion of students consuming takeaway foods at least twice a week by country



Fruit drink and soft drink consumption

More than one-quarter of students drank regular (non-diet) soft drinks and a similar proportion drank fruit drinks on 4 or 5 of the previous five school days. Approximately one-third of students drank two or more cans of soft drink on the previous school day (Table 10, Table 11)

By country

Approximately 30% of students from New Zealand, Fiji, and Tonga consumed soft drinks on 4 or 5 of the previous five school days compared with fewer than 20% of Australian students (12% females; 19% males). More than 30% of students from New Zealand, Tonga and Australia consumed fruit drinks on 4 or 5 of the previous five school days, compared with approximately 20% of students from Fiji (19% females; 21% males) (Figure 13).

By gender and ethnicity

In New Zealand, more than 30% of Pacific students (33% females; 31% males) and Māori students (32% females; 31% males) consumed soft drinks on 4 or 5 of the previous five school days. Approximately 40% of Māori students (41% females; 43% males) and European students (38% females; 36% males) consumed fruit drinks on 4 or 5 of the previous five school days, compared with fewer than one-quarter of Asian students (20% females; 24% males). In Fiji and Australia, soft drink was higher among male students than female students.

After school snack consumption

Approximately 40% of students reported that they usually ate fruit as an afternoon snack most days. More than one-third of students reported eating biscuits or chips and approximately one-quarter of students ate chocolates or sweets most days after school (Table 12).

By country

Consuming fruit as an afternoon snack most days/ everyday was common among students from Australia (54% females; 53% males) and New Zealand (45% females; 41% males) while bread-based snacks (such as toast, buns, and sandwiches) were commonly consumed in Tonga (83% females; 86% males). Approximately 25% of students in New Zealand and Tonga usually ate pies, takeaways, or hot chips most days/ every day after school (Figure 14). Consumption of biscuits or chips and chocolates or sweets was similar across the four countries.

By gender and ethnicity

Few gender differences were observed for consumption of fruit and pies, takeaways and hot chips after school within each of the four countries, but consumption of chocolates or sweets after school was more common among females than males in New Zealand (33% females; 27% males), Fiji (31% females; 21% males), and Tonga (25% females; 15% males). In Australia, males were more likely than females to eat bread-based snacks (44% females; 55% males) and biscuits or chips (27% females; 37% males) after school. In New Zealand, approximately 30% of Pacific students usually ate pies, takeaways, or hot chips most days/ every day after school, compared with 10% of European students. In Fiji, more than 40% of Indigenous students and student of Other ethnicities usually ate bread-based snacks after school, compared with 30% of Indo-Fijian students.

Figure 13. Proportion of students consuming fruit drinks or soft drinks on 4 or 5 of previous five school days by country

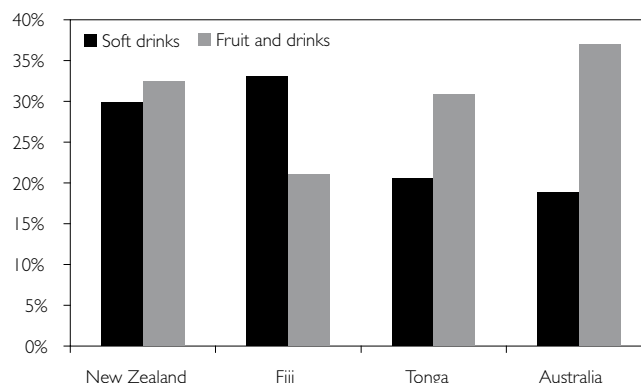
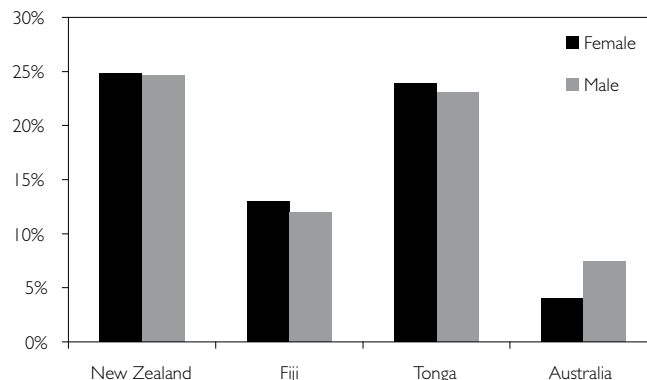


Figure 14. Proportion of students who eat pies, takeaways, or hot chips after school most days/ everyday by country



Buying snack food from shops/ takeaways over past 5 school days

Nearly 20% of females and 15% of males bought snack foods from a shop/ takeaway on 4 or 5 of the previous five school days (Table 16).

By country

Approximately 20% of students from New Zealand (19% females; 18% males), Fiji (25% females; 20% males), and Tonga (23% females; 14% males) bought snack foods from the shops/ takeaways on 4 or 5 of the previous five schools days, compared with fewer than 5% of students from Australia.

By gender and ethnicity

In Fiji and Tonga, buying snack foods after school was more common among females than males. Nearly one-quarter of Pacific students in New Zealand (23% females; 23% males) and Indigenous students (29% females; 23% males) in Fiji bought snack foods after school on 4 or 5 of the previous five school days.

Money spent on food on last school day

Approximately 25% of students did not spend any money on food on the previous school day, while 30% of students spent \$5 or more.

By country

Fewer than 50% of students from Australia spent money on food on the previous school day, while approximately 80% of students from New Zealand, Fiji and Tonga did so. In Fiji and Tonga, most students spent between \$1 and \$4 on food on the previous school day. In New Zealand, more than 50% of students spent \$5 or more.

By gender and ethnicity

Few differences in spending money were observed by gender within each of the four countries. In New Zealand, one-quarter of Māori students (27% females; 25% males) and 20% of Pacific students (20% females; 21% males) spent more \$10 or more on food on the previous school day (Figure 15). Approximately 40% of Asian students (35% females; 43% males) and European students (39% females; 42% males) did not spend any money on food on the previous day, compared with less than 20% of Māori students (17% females; 20% males) and Pacific students (12% females; 13% males).

Figure 15. Proportion of students who spent \$10 or more on food on previous school day by ethnicity – New Zealand

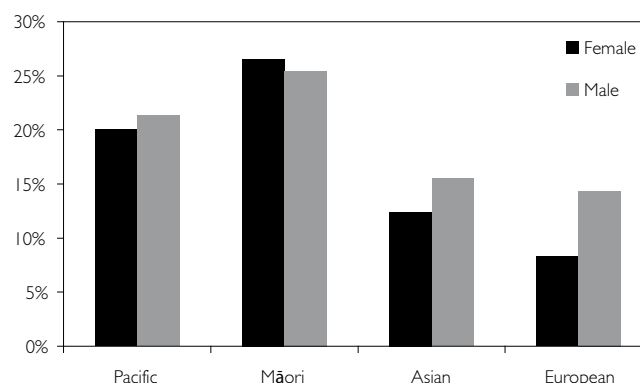


Table 6. Breakfast consumption behaviours

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	
Source of breakfast													
Female	Home	64	67	75	80	67	88	91	85	89	72	87	81
	School canteen or tuckshop	8	3	5	1	6	4	2	2	2	11	0	4
	Shop (outside school)	13	10	2	3	10	3	0	3	2	10	0	5
	I don't eat breakfast	14	21	18	17	16	5	8	10	7	6	12	10
Male	Home	64	67	82	75	68	93	95	93	94	73	93	84
	School canteen or tuckshop	5	2	3	1	4	2	2	2	2	12	1	3
	Shop (outside school)	17	11	1	3	13	4	0	1	2	9	0	5
	I don't eat breakfast	14	19	14	21	16	2	3	4	3	4	6	7
Ate breakfast in past 5 school days³													
Female	0 to 1 day	10	14	9	5	10	10	6	6	8	7	3	8
	2 to 3 days	37	33	19	21	33	24	16	26	20	27	12	23
	4 to 5 days	52	53	73	74	57	66	78	68	72	66	86	70
Male	0 to 1 day	10	10	5	3	9	10	7	5	8	8	3	7
	2 to 3 days	37	33	19	20	33	16	10	17	12	29	10	18
	4 to 5 days	53	56	76	78	59	74	84	78	80	62	88	75

³ Sample size is reduced because this question was only asked among those students who reported eating breakfast in previous question (n = 13,995).

Table 7. Morning tea consumption behaviours

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	
Source of morning tea													
Female	Home	32	41	48	61	39	19	38	25	29	5	87	38
	School canteen or tuckshop	48	42	30	20	42	73	54	61	62	74	7	49
	Shop (outside school)	11	5	3	3	8	3	1	2	2	8	0	4
	I don't eat morning tea	8	11	19	16	11	4	6	10	6	6	5	9
Male	Home	33	39	58	59	40	27	53	30	42	9	88	47
	School canteen or tuckshop	45	42	23	17	39	62	42	55	50	67	9	40
	Shop (outside school)	11	8	2	3	8	4	1	1	2	8	0	4
	I don't eat morning tea	10	10	15	19	11	4	4	12	5	8	3	9
Ate morning tea in past 5 school days¹													
Female	0 to 1 day	7	5	8	5	7	10	9	10	9	5	1	7
	2 to 3 days	31	26	26	25	29	35	24	30	30	26	11	25
	4 to 5 days	62	69	66	70	65	55	67	60	62	69	88	68
Male	0 to 1 day	7	6	7	4	6	9	9	6	9	10	2	7
	2 to 3 days	31	27	19	18	28	30	19	28	24	28	7	21
	4 to 5 days	63	67	74	78	66	61	72	67	67	62	92	72

¹Sample size is reduced because this question was only asked among those students who reported eating morning tea in previous question (n = 14,365).

Table 8. Lunch consumption behaviours

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	
Source of lunch													
Female	Home	27	38	48	58	35	80	83	78	82	7	85	59
	School canteen or tuckshop	55	48	38	27	49	15	8	18	11	72	12	30
	Shop (outside school)	13	7	3	5	10	1	1	1	1	10	0	5
	I don't eat lunch	4	5	10	8	5	2	8	2	5	2	3	7
Male	Home	28	39	57	60	37	86	91	84	89	13	86	65
	School canteen or tuckshop	53	45	34	23	46	10	7	13	8	65	11	26
	Shop (outside school)	14	10	2	3	11	2	0	1	1	7	1	4
	I don't eat lunch	4	4	8	12	5	1	2	1	2	4	2	5
Ate lunch on past 5 school days¹													
Female	0 to 1 day	7	5	6	2	6	8	14	5	10	3	3	7
	2 to 3 days	29	32	28	26	29	17	17	19	17	20	13	20
	4 to 5 days	64	63	66	71	65	76	69	77	73	77	85	73
Male	0 to 1 day	7	6	8	4	7	8	10	6	9	6	2	6
	2 to 3 days	26	26	20	26	26	10	9	9	10	24	7	15
	4 to 5 days	66	68	73	70	68	83	81	85	81	70	91	79

¹ Sample size is reduced because this question was only asked among those students who reported eating lunch in previous question (n = 15,033).

Table 9. Consumption of fruit, vegetables and takeaway foods

	New Zealand					Fiji				Tonga	Australia	All four countries
	Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
	%	%	%	%	%	%	%	%	%	%	%	
Ate 2 or more servings of fruit per day												
Female	65	58	46	56	61	41	29	41	35	66	58	50
Male	64	56	49	50	60	42	33	47	37	66	56	51
Ate 2 or more servings of vegetables per day												
Female	61	63	62	73	63	53	50	64	52	64	76	54
Male	58	61	59	68	60	63	57	79	61	67	77	59
Ate takeaways 2 or more times per week												
Female	28	29	14	9	25	17	10	9	13	44	5	19
Male	28	27	14	14	25	15	12	9	13	35	6	17
Ate takeaways for dinner more than once a week												
Female	19	21	6	3	16	9	9	5	9	22	3	12
Male	17	19	8	9	16	12	9	6	10	24	4	12

Table 10. Soft drink consumption

	New Zealand					Fiji				Tonga	Australia	All four countries	
	Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All		
	%	%	%	%	%	%	%	%	%	%	%		
Regular (non-diet) soft drink consumption in past 5 school days													
Female	0 to 1 day	21	26	31	40	25	29	26	30	28	37	60	34
	2 to 3 days	46	42	46	39	44	46	46	36	45	36	28	41
	4 to 5 days	33	32	22	21	31	25	28	33	27	27	12	26
Male	0 to 1 day	21	22	31	39	25	29	20	19	24	43	46	31
	2 to 3 days	48	46	42	37	46	43	45	47	43	36	35	41
	4 to 5 days	31	31	27	24	30	29	35	33	33	21	19	27
Soft drink consumption on previous school day													
Female	None	17	24	37	45	24	24	23	34	24	30	58	31
	One can or less	42	36	40	36	39	48	49	35	47	38	32	41
	Two cans or more	41	43	22	19	37	28	29	31	29	32	10	28
Male	None	18	22	32	40	22	23	18	23	20	35	50	29
	One can or less	36	37	43	31	37	38	39	37	39	28	30	35
	Two cans or more	46	41	25	29	41	39	43	40	41	37	20	36

Table 11. Fruit drink consumption

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	%
Fruit drink consumption in past 5 school days													
Female	0 to 1 day	25	22	39	30	27	37	43	36	40	27	40	35
	2 to 3 days	45	37	41	31	41	42	39	40	41	35	31	38
	4 to 5 days	30	41	20	38	32	21	17	24	19	38	29	27
Male	0 to 1 day	28	20	34	33	28	39	41	37	40	28	33	34
	2 to 3 days	42	36	42	31	40	39	38	38	39	41	30	37
	4 to 5 days	30	43	24	36	32	22	21	26	21	31	37	29
Fruit drink consumption on previous school day													
Female	None	22	18	33	27	23	26	34	29	30	25	35	29
	One glass	10	12	18	18	12	34	16	13	14	12	25	15
	Two glasses or more	68	70	48	55	65	29	50	59	56	63	40	56
Male	None	22	19	29	25	23	27	31	23	29	28	29	28
	One glass	10	10	18	20	12	9	13	13	11	8	21	8
	Two glasses or more	68	71	53	56	66	64	56	63	59	64	49	64

Table 12. After school snack consumption

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	%
Ate fruit after school most days/ everyday													
Female		42	47	48	51	45	32	3	41	36	25	54	40
Male		39	46	43	46	41	37	40	42	39	32	53	42
Ate bread-based snack after school most days/ everyday													
Female		57	64	44	47	56	43	29	46	36	83	44	49
Male		58	64	47	60	58	41	30	49	35	86	55	52
Ate biscuits, potato chips, noodles after school most days/ everyday													
Female		36	35	33	27	34	40	36	34	37	38	27	35
Male		35	35	37	37	36	41	37	38	39	22	37	35
Ate pies, takeaways, hot chips after school most days/ everyday													
Female		30	24	15	10	25	14	13	6	13	24	4	16
Male		31	21	9	12	25	10	13	9	12	23	7	16
Ate chocolates or sweets after school most days/ everyday													
Female		35	34	27	21	33	29	33	26	31	25	20	29
Male		27	30	25	24	27	18	23	14	21	15	22	22

Table 13. Snack food purchasing behaviours

		New Zealand					Fiji				Tonga	Australia	All four countries %
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	
Bought snack food from a shop/takeaway in past 5 school days													
Female	0 to 1 day	32	36	62	61	39	28	45	45	38	44	74	45
	2 to 3 days	45	46	28	28	42	42	33	37	37	33	23	35
	4 to 5 days	23	18	10	11	19	29	22	18	25	23	4	19
Male	0 to 1 day	33	41	69	61	41	39	46	47	43	51	75	51
	2 to 3 days	44	44	25	30	40	38	37	38	37	35	21	34
	4 to 5 days	23	16	6	9	18	23	18	15	20	14	4	15
Money spent on food on last school day													
Female	None	12	17	35	39	18	12	19	33	17	12	57	24
	\$1 to 4	34	24	32	34	32	63	62	50	62	53	32	47
	\$5 to 9	33	33	21	18	30	19	14	11	16	25	9	20
	\$10 or more	20	27	12	8	19	7	4	6	5	11	2	10
Male	None	13	20	43	42	21	14	15	20	15	15	55	26
	\$1 to 4	31	20	24	27	27	60	60	53	60	54	30	43
	\$5 to 9	35	34	18	17	31	19	17	17	19	20	11	20
	\$10 or more	21	25	16	14	21	6	8	9	7	11	4	11

Physical Activity and Leisure Time Activities

Young people who are physically active are leaner, have better cardiovascular profiles, stronger bones, and fewer symptoms of anxiety and depression (Physical Activity Guidelines Committee, 2008). In New Zealand, Sport and Recreation New Zealand (SPARC), the Ministry of Health, and the Ministry of Education, in consultation with the Ministry of Youth Development have agreed on Guidelines for Children and Young People [New Zealand Physical Activity Guidelines for Children and Young People (5-18 years)] (<http://www.sparc.org.nz/getting-active/activity-guidelines>). Much of the recommended amount of physical activity can be achieved at school through opportunities for activity during the school day. Activity guidelines also recommend that young people spend less than 2 hours per day (outside of school time) watching television, using the computer, or playing video games. Not only do these activities keep young people sedentary for long periods, but extended use can also impact on eating patterns and general well-being (Hastings et al., 2003; Scragg et al., 2006).

Key points

- Males were more likely than females to be engaged in physical activities (i.e., running around) during the morning and lunchtime breaks during the school day.
- Multiple opportunities exist for increasing physical activity during the school day; yet less than one-third of students played actively during morning and lunchtime breaks.
- Approximately two-thirds of students did physical activities after school on 3 or fewer of the previous five school days.
- Nearly 40% of students in New Zealand spent 2 or more hours per day watching television, compared with approximately one-quarter of students in Fiji and Australia and 15% in Tonga.

Physical activities

Approximately 40% of males and 30% of females did physical activities after school on 4 or 5 of the previous five school days. One-third of males and less than 20% of females were mostly active during the lunchtime break at school (Table 14).

By country

Approximately one-quarter of students from New Zealand (25 females; 31% males) and Tonga (22% females; 31% males) spent their morning tea/ interval breaks playing mostly active games, compared with fewer than 20% of students in Fiji (13% females; 19% males). In contrast, approximately 40% of students from Fiji (33% females; 46% males) were the physically active after school on 4 or 5 of the previous five school days, compared with approximately one-third of students from Tonga (25% females; 39% males) and Australia (29% females; 35% males).

By gender and ethnicity

Within each country, males were more likely than females to play active games during morning tea/ interval and lunch, and doing physical activities after school. In New Zealand, nearly 40% of Pacific students usually played active games during lunch break (36% females; 43% males), compared with approximately 20% of European students (14% females; 25% males).

Television use

Approximately 50% of students spent one hour or less per day watching television, while more than 25% watched television for two or more hours per day.

By country

Watching television for 2 or more hours per day was common among students in New Zealand (37% females; 41% males), while fewer than 20% of students in Tonga (14% females; 16% males) did so (Figure 18).

By gender and ethnicity

In New Zealand, watching 2 or more hours of television per day was most common among Pacific students (42% females; 45% males) followed by Māori students (35% females; 42% males), Asian students (37% females; 45% males), and European students (39% females; 37% males). Few differences in television use were observed by gender.

Figure 16. Proportion of students who watch 2 or more hours of television per day by country

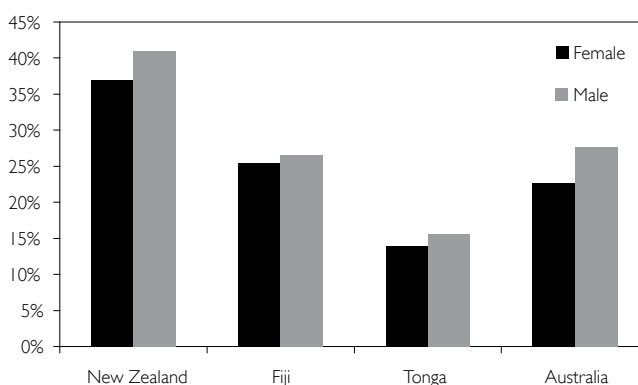


Table 14. Physical activities and television use

	New Zealand					Fiji				Tonga	Australia	All four countries	
	Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All		
	%	%	%	%	%	%	%	%	%	%	%		
Mostly active during morning recess/interval													
Female	29	23	21	11	25	17	10	8	13	22	9	17	
Male	34	33	25	21	31	19	19	14	19	31	39	24	
Mostly active during lunch break													
Female	36	27	24	14	31	11	9	8	9	19	14	18	
Male	43	36	31	25	38	16	18	18	18	28	48	33	
Did physical activities after school, past 5 school days													
Female	0 to 1 day	22	27	39	34	26	30	29	30	30	43	25	31
	2 to 3 days	38	39	35	42	38	35	40	32	37	32	46	38
	4 to 5 days	40	34	26	24	36	35	31	39	33	25	29	31
Male	0 to 1 day	20	24	39	38	25	23	25	20	24	27	21	24
	2 to 3 days	36	37	32	32	35	27	32	27	30	33	45	36
	4 to 5 days	44	39	29	30	40	50	43	53	46	39	35	40
Time spent watching TV, past week													
Female	1 hour per day or less	34	40	38	37	38	58	50	46	53	70	52	52
	>1 to 2 hours per day	24	25	25	24	25	20	21	25	21	17	26	22
	2+ hours per day	42	35	37	39	37	22	28	29	25	14	23	26
Male	1 hour per day or less	26	34	33	37	33	53	50	38	51	65	43	47
	>1 to 2 hours per day	29	24	22	26	26	24	21	30	23	20	30	25
	2+ hours per day	45	42	45	37	41	23	29	32	27	16	28	29

Family and Home Environment

The family and home environment plays an important role in adolescent nutrition and physical activity. Accessibility of healthy and unhealthy foods at home, parental support for healthy eating, and family eating patterns can each influence the eating practices of adolescents and families. (Krahnstoever Davison et al., 2005; Rosenkranz et al., 2008) Similarly, parents and families can encourage physical activity by providing support for their children to be physically active, role modeling physical activity, and reducing the opportunities for sedentary behaviours (e.g television use). (Krahnstoever Davison et al., 2005)

Key points

- Nearly two-thirds of students ate a meal with their family on 4 or 5 of the previous five school days.
- Only 50% of students in Tonga reported having fruit available to eat at home most of the time. Across all four countries, nearly 50% of students had potato crisps or chips available to eat at home most of the time.
- Approximately half of students reported a lot of parental support for physical activity.
- Almost all students reported having a television at home, but more than 50% of students in New Zealand have a television in their bedroom.
- Nearly all students in Tonga and Fiji reported that their parents restricted their television use, compared with only about half of students in New Zealand and Australia.

Frequency of family meals

More than 60% of students (64% females; 63% males) ate a meal with their family on 4 or 5 of the previous five school days (Table 15).

By country

Approximately two-thirds of students in Fiji (64% females; 65% males), Tonga (74% females; 65% males), and Australia (68% females; 70% males) ate a meal with their family on 4 or 5 of the previous five school days. Fewer than 60% of students in New Zealand reported that they frequently ate meals with their families (57% females; 56% males) (Figure 17).

By gender and ethnicity

The frequency of students eating meals with their family was similar by gender in New Zealand, Fiji and Australia, but in Tonga females were more likely to eat meals with their families than males. Few ethnic differences in frequency of family meals were observed in New Zealand and Fiji.

Home availability of foods

Three-quarters of students reported that there was fruit available to eat at home most days or everyday. Nearly half of the students reported that there were chips available to eat at home most days and approximately one-third reported having soft drinks available to drink at home most days.

By country

The proportion of students who have fruit available to eat at home on most days or everyday varies considerably by country. Nearly all students in Australia (97% females; 98% males) have fruit available to eat at home on most days or everyday, compared with approximately 80% in New Zealand (84% females; 83% males), 70% in Fiji (70% females; 68% males) and 50% in Tonga (47% females; 52% males). In contrast, few differences were observed in the availability of less healthy snack foods, such as chips, chocolates, or soft drinks by country.

By gender and ethnicity

Home availability of foods was similar for both males and females within each country, except in Tonga where females reported greater availability of chips (42% females; 27% males) and chocolates (28% females; 21% males). In New Zealand, 80% of Pacific students (79% females; 79% males) reported that there was fruit available to eat at home most days or everyday, compared with approximately 90% of Māori students (90% females; 84% males), Asian students (94% females; 92% males), and European students (90% females; 96% males). In Fiji, more than 70% of Indo-Fijian students and students of Other ethnicities have fruit available at home most days or more often, compared with only 60% of Indigenous students. In contrast, a high proportion of Indo-Fijian students reported availability of chocolates (41% females; 36% males) and soft drinks (44% females; 45% males) at home on most days or everyday (Figure 18).

Figure 17. Proportion of students who ate family meals on 4 or 5 of previous five school days by country

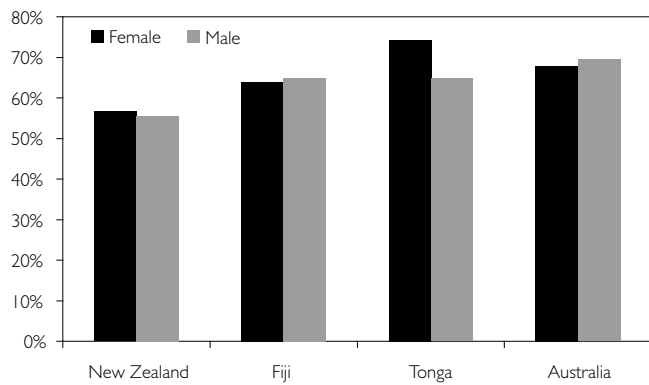
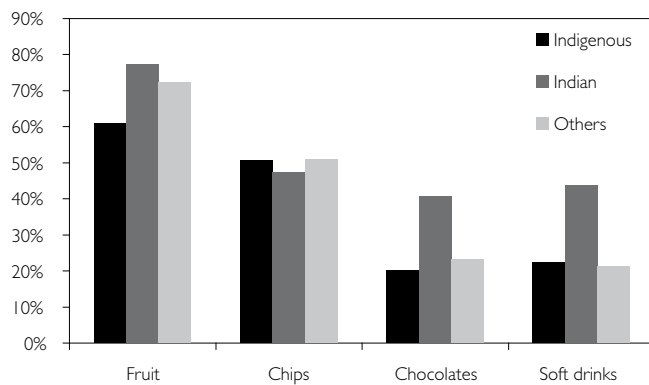


Figure 18. Home availability of foods by ethnicity among females – Fiji



Parental support for healthy eating

Approximately two-thirds of students reported that their mothers provided a lot of support for healthy eating, while more than 50% of students reported the same of their fathers (Table 16).

By country

Maternal and paternal support for healthy eating was high among students from Fiji and Tonga. In Fiji, approximately 75% of students reported a lot of maternal support for healthy eating and 67% reported a lot of paternal support for healthy eating. In Tonga, more than 60% of students reported a lot of parental support for healthy eating.

By gender and ethnicity

There were few differences in reported parental support for healthy eating within each country by gender. In New Zealand, only half of European students reported a lot maternal support for healthy eating and approximately one-quarter reported a lot of paternal support for healthy eating (Figure 19). In Fiji, a high proportion of Indigenous students reported a lot paternal support for healthy eating (70% females; 70% males); ethnic differences in perceived maternal support were not observed.

Parental support for physical activity

Approximately 50% of students reported a lot of maternal support for being physically active. Similar proportions of students reported a lot of paternal support for physical activity (Table 17).

By country

Approximately 50% of students within each country reported a lot of maternal support for physical activity. Among male students, 65% of Fiji students and 61% of Tongan students reported a lot of paternal support for physical activity, compared with approximately half of male students in New Zealand and Australia.

By gender and ethnicity

In New Zealand, Pacific students and Māori students reported high levels of parental support for physical activity. More than 50% of Pacific students (52% females; 53% males) and Māori students (53% females; 51% males) reported that their mothers provided a lot of support for physical activity compared with fewer than 40% of Asian students and European students. Few gender differences were observed within each country for maternal support for physical activity. In Fiji (51% females; 65% males) and Australia (41% females; 52% males), males reported more paternal support for physical activity than females.

Home availability of televisions and computers

Nearly all students reported having a television at home; approximately one-third of students reported having a television in their bedroom. Approximately 70% of students reported that their parents placed some restrictions on their television use (Table 18).

By country

Almost all students in New Zealand, Fiji, and Australia had a television at home, compared with approximately 80% of students in Tonga (84% females; 80% males). A high proportion of students in New Zealand (49% females; 55% males) and Australia (36% females; 56% males) had a television in their bedroom (Figure 20). Very high proportions of students in Australia (98% females; 99% males) and New Zealand (88% females; 89% males) had a video game or computer at home, compared with approximately 60% of students in Fiji and 50% of students in Tonga. Almost all students in Fiji (89% females; 89% males) and Tonga (92% females; 88% males) reported that their parents limited their television use compared with fewer than 60% of students in New Zealand and 40% of students in Australia.

By gender and ethnicity

Few gender differences were apparent in the home availability of televisions and computers, but in New Zealand, Australia and Fiji, males were more likely to have a television in their bedroom than females. In New Zealand, almost all Māori students, Asian students, and European students had a video game or computer at home compared with approximately 80% of Pacific students (83% females; 86% males). In Fiji, approximately three-quarters of Indo-Fijian students (71% females; 77% males) and students of Other ethnicities (76% females; 80% males) reported home availability of video games and computers compared with approximately half of the Indigenous students (53% females; 53% males).

Figure 19. Proportion of students reporting a lot of maternal support for healthy eating by ethnicity – New Zealand

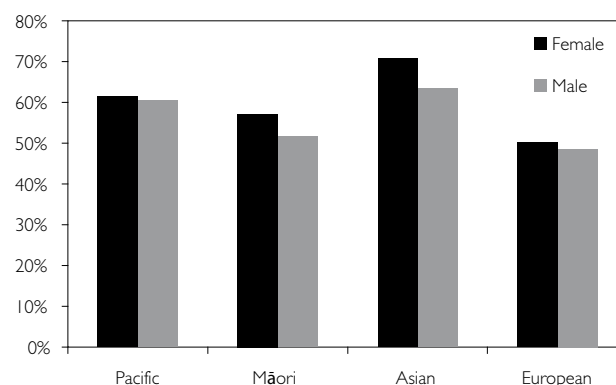


Figure 20. Proportion of students who have a TV in their bedroom by country

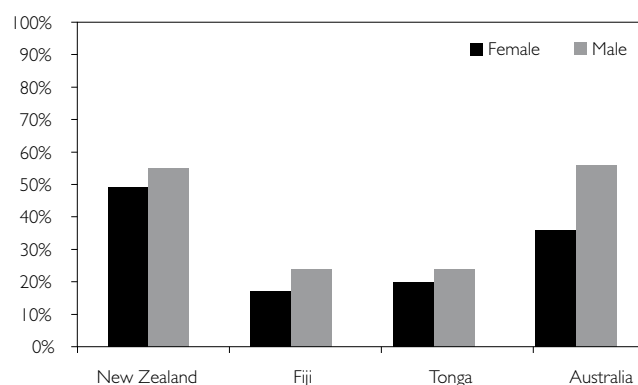


Table 15. Family meals and home availability of foods

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	%
Frequency of family meals in past 5 school days													
Female	0 to 1 day	16	17	20	18	17	12	13	17	13	7	11	13
	2 to 3 days	29	25	21	24	27	22	24	20	23	19	21	23
	4 to 5 days	56	58	59	58	57	66	63	64	64	74	68	64
Male	0 to 1 day	16	14	14	17	15	12	12	16	12	11	11	13
	2 to 3 days	30	30	25	24	29	23	23	16	23	24	20	24
	4 to 5 days	54	56	61	60	56	65	65	67	65	65	70	63
Fruit available to eat at home, most days or everyday													
Female		79	90	94	90	84	61	77	72	70	47	97	75
Male		79	84	92	96	83	60	73	74	68	52	98	77
Potato chips available to eat at home, most days or everyday													
Female		36	53	49	49	42	51	47	51	49	42	44	45
Male		39	49	49	52	43	52	52	45	52	27	48	45
Chocolates available to eat at home, most days or everyday													
Female		22	32	36	23	26	20	41	23	30	28	29	29
Male		22	28	32	28	25	17	36	19	27	21	32	27
Soft drinks available to drink at home, most days or everyday													
Female		33	40	46	28	35	22	44	21	33	38	29	33
Male		34	36	47	38	36	21	45	24	34	34	33	34

Table 16. Parental support for healthy eating

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	%
Maternal support for healthy eating													
Female	A lot	61	57	71	50	60	75	76	76	76	70	55	67
	Some/ a little	33	36	25	41	34	18	20	19	19	26	41	28
	None	4	6	4	5	5	3	3	2	3	2	3	3
	Don't live with mother	1	1	0	3	1	5	1	4	3	2	2	2
Male	A lot	60	52	63	49	58	77	74	78	75	64	57	65
	Some/ a little	34	39	34	43	36	17	24	18	21	30	39	30
	None	4	6	3	5	4	2	1	0	1	3	3	3
	Don't live with mother	2	3	0	4	2	4	1	4	3	3	2	2
Paternal support for healthy eating													
Female	A lot	49	37	55	26	45	70	64	60	67	65	32	54
	Some/ a little	37	42	32	47	39	19	26	22	23	26	49	33
	None	8	9	8	16	9	3	5	7	4	3	10	6
	Don't live with father	6	12	6	11	8	8	5	12	7	6	10	7
Male	A lot	49	32	45	26	43	70	65	65	67	60	32	51
	Some/ a little	38	43	40	45	40	21	29	27	26	31	53	37
	None	7	12	10	15	9	2	3	1	2	4	8	6
	Don't live with father	5	14	5	13	8	7	4	6	5	6	8	7

Table 17. Parental support for physical activity

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	%
Maternal support for physical activity													
Female	A lot	52	53	36	34	49	49	55	53	52	55	47	51
	Some/ a little	40	38	53	48	42	41	41	40	41	39	47	42
	None	5	6	9	14	7	5	3	5	4	4	4	5
	Don't live with mother	2	3	2	4	2	6	2	3	3	2	2	3
Male	A lot	53	51	37	40	50	45	53	53	49	59	52	51
	Some/ a little	38	38	46	45	39	48	43	40	45	34	42	41
	None	5	7	16	9	7	4	3	2	3	4	4	5
	Don't live with mother	4	4	1	6	4	4	1	5	3	4	2	3
Paternal support for physical activity													
Female	A lot	54	46	41	30	48	50	53	46	51	52	41	49
	Some/ a little	32	32	40	39	33	37	38	38	37	38	42	37
	None	6	6	9	14	7	5	4	5	5	5	7	6
	Don't live with father	9	16	9	17	11	8	5	11	7	5	9	8
Male	A lot	59	49	38	36	52	56	67	67	65	61	52	57
	Some/ a little	28	31	43	42	32	34	27	27	25	29	37	32
	None	4	6	11	8	6	4	3	3	2	5	4	4
	Don't live with father	9	14	8	14	10	6	3	3	8	5	8	7

Table 18. Home availability of televisions, video games and computers

		New Zealand					Fiji				Tonga	Australia	All four countries
		Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
		%	%	%	%	%	%	%	%	%	%	%	%
Has a television at home													
Female		97	97	95	100	97	93	96	96	95	84	99	95
Male		97	98	97	98	97	93	96	99	95	80	98	95
Has a television in bedroom													
Female		43	66	40	56	49	16	18	19	17	20	36	30
Male		49	71	50	60	55	18	28	29	24	24	56	40
Has video games, electronic games or computer at home													
Female		83	94	92	98	88	53	71	76	63	53	98	75
Male		86	92	95	98	89	53	77	80	66	56	99	80
Parents limit television use													
Female		67	34	61	35	57	88	89	88	89	92	43	72
Male		67	32	59	37	56	90	89	88	89	88	42	69

School Environment

Schools are in a unique position to promote physical activity and encourage healthy eating for students. Young people spend approximately one-third of their day at school and consume more than one-third of their energy intake there (Bell et al., 2004). Schools can encourage physical activity and healthy eating behaviours by creating environments that support healthy eating and physical activity, provide opportunities for activity during the school day, and provide ongoing staff training and support so staff can support students (Wechsler et al., 2000).

Key points

- More than two-thirds of students in Fiji and Tonga considered their teachers to be good role models for healthy eating and physical activity.
- Fewer than 30% of students reported that the food and drinks available at school were mostly healthy.
- Approximately 60% of students in New Zealand, Fiji and Tonga thought their school provided a lot of support for all students to play organized sports.

School supports healthy food choices

Approximately 40% of students reported a lot of school support for them to make healthy food choices (Table 19).

By country

Approximately half of all students in Tonga (58% females; 53% males) and Fiji (52% females; 49% males) reported a high level of school support for healthy food choices, while fewer than 20% of students from Australia (18% females; 16% males) did so (Figure 21).

By gender and ethnicity

In New Zealand, the Pacific students (37% females; 36% males) and Māori students (33% females; 30% males) reported high levels of school support for healthy food choices. In Fiji, more than half of Indo-Fijian students reported school support for healthy food choices (56% females; 52% males).

Food and drinks available in school canteen

Fewer than 30% of students felt that the food and drinks available at the school canteen were mostly healthy.

By country

More than one-third of students in Tonga (31% females; 36% males) reported that the food and drinks available in their school canteen were mostly healthy compared with 10% of Australian students (Figure 22).

By gender and ethnicity

Few differences by gender or ethnicity were observed.

Figure 21. Proportion of students reporting a lot of school support for student's healthy food choices by country

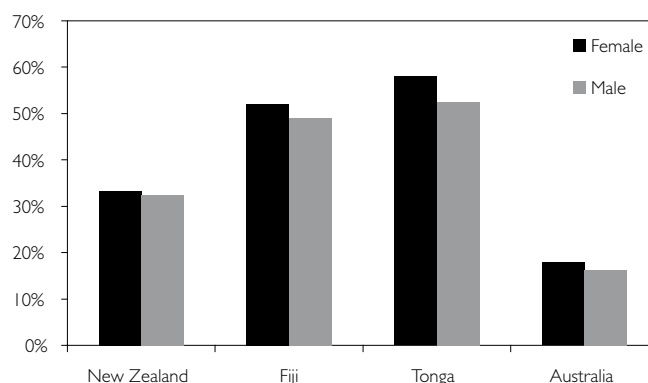
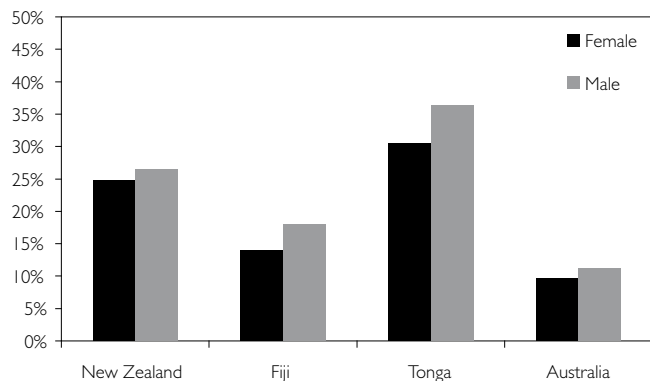


Figure 22. Proportion of students who think the foods and drinks in the school canteen are mostly healthy by country



Teachers as role models

More than 50% of students felt that their teachers were good role models for physical activity and healthy eating.

By country

Approximately two-thirds of students from Tonga (68% females; 66% males) and Fiji (65% females; 62% males) rated their teachers as excellent or good role models for healthy eating, compared with half of students in New Zealand (50% females; 50% males) and 40% of students in Australia (45% females; 37% males). A high proportion of students from Tonga (72% females; 68% males) and Fiji (70% females; 65% males) also rated their teachers as good or excellent role models for being physically active (Figure 23).

By gender and ethnicity

Female students in Australia and Fiji were more likely than male students to rate their teachers as excellent or good role models for physical activity. In New Zealand, less than one-third of European students regarded their teachers as excellent or good role models for healthy eating and physical activity, compared with approximately half of Pacific, Māori and Asian students.

School support for physical activity

Across all four countries, more than half of students reported a lot of school support for students to play organized sports and nearly one-third of students reported that their school encouraged all students to be active at lunchtime.

By country

Approximately two-thirds of students from Tonga (70% of females; 64% of males) reported school support for all students to play organized sports, compared with approximately 50% of students in New Zealand (54% females; 53% males), Fiji (62% females; 52% males), and Australia (49% females; 37% males).

By gender and ethnicity

In Fiji, Tonga and Australia, female students were more likely to report school support for organized sports than male students. In New Zealand, approximately two-thirds of Pacific students (61% females; 58% males) reported school support for organized sports compared with less than 40% of European students (30% females; 38% males) (Figure 24).

Figure 23. Proportion of students who consider their teachers to be good/excellent role models for being physically active by country

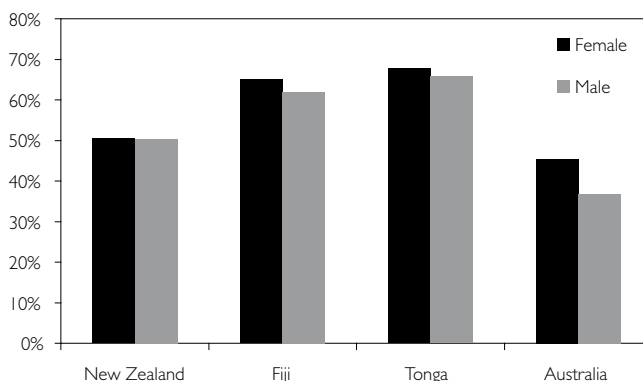


Figure 24. Proportion of students who perceive a lot of school support for all students to play organised sports by ethnicity – New Zealand

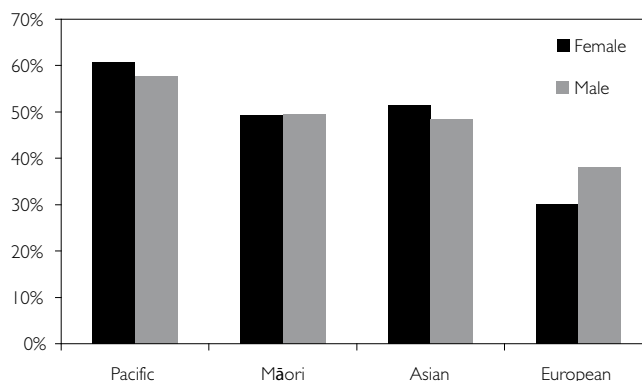


Table 19. School support for healthy eating and physical activity

	New Zealand					Fiji				Tonga	Australia	All four countries
	Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
	%	%	%	%	%	%	%	%	%	%	%	%
A lot of school support for student's healthy food choices												
Female	37	33	27	20	33	49	56	32	52	58	18	42
Male	36	30	27	25	32	47	52	34	49	53	16	38
Foods and drinks in canteen are mostly healthy												
Female	25	23	27	26	25	16	13	8	14	31	10	26
Male	27	25	27	27	26	19	18	13	18	36	11	29
Teachers are good/ excellent role models for healthy eating												
Female	56	45	52	28	50	64	67	41	65	68	45	58
Male	57	42	48	31	50	61	63	46	62	66	37	54
Teachers are good/ excellent role models for being physically active												
Female	59	50	53	29	53	72	72	45	70	72	45	62
Male	57	45	48	33	51	67	66	53	65	68	35	55
A lot of school support for all students to play organized sports												
Female	61	49	52	30	54	58	66	59	62	70	49	59
Male	58	50	48	38	53	49	53	55	52	64	37	50
A lot of school encouragement for all students to be active at lunchtime												
Female	32	26	26	9	27	29	41	18	35	44	13	31
Male	32	27	23	18	29	23	31	21	28	42	18	28

Neighbourhoods and Communities

Young people, their schools and their families all exist within the wider context of their neighbourhoods and communities. The role of neighbourhoods and communities in promoting physical activity has been increasingly researched, but the findings are inconsistent and warrant further study (Ferreira et al., 2007). Neighbourhoods and communities may encourage physical activity through creating opportunities/ spaces for activity, enacting traffic calming measures and dog control, reducing crime and improving perceptions of safety.

Key points

- A high proportion of students reported feeling safe in their neighbourhoods at night, but females were less likely to report feelings of safety than males.
- Approximately 60% of students in Tonga reported being bothered by dogs and traffic when walking in their neighbourhoods.
- Approximately one-quarter of students reported being bothered by other people when walking in their neighbourhoods.

Perceptions of neighbourhood safety

A higher proportion of males (81%) than females (64%) reported feeling safe in their neighbourhoods at night (Table 20).

By country

Most students within each country reported feeling safe in their neighbourhoods at night. A high proportion of students from Tonga (64% females; 73% males) reported that their parents thought it was safe for them to be out in their neighbourhoods at night, compared with approximately 50% of students in Australia, 40% of students in Fiji, and 30% of students in New Zealand.

By gender and ethnicity

A higher proportion of males than females reported that they felt safe in their neighbourhood at night and that their parents thought that their neighbourhood was safe at night within each of the four countries. In New Zealand and Fiji, few differences in perceived neighbourhood safety were observed by ethnicity.

Neighbourhood nuisances

Approximately one-third of students reported that traffic or dogs were a nuisance when walking in their neighbourhoods. Approximately 25% of students were bothered by other people when walking in their neighbourhoods.

By country

Approximately 60% of students in Tonga (57% females; 63% males) and 40% of students in Fiji (36% females; 44% males) were bothered by dogs when walking in their neighbourhoods, compared with 30% of students in New Zealand and fewer than 20% of students in Australia (Figure 25). Likewise, a high proportion of students in Tonga were bothered by traffic (62% females; 68% males) and by other people (45% of females; 47% males) in their neighbourhoods compared with approximately 10% of students in Australia.

By gender and ethnicity

Few gender differences were observed for being bothered by dogs, traffic or other people within each of the four countries. In New Zealand, traffic was a nuisance for nearly one-third of Pacific students compared with approximately 15% of European students (13% females; 17% males).

Friend support for physical activity

Nearly 40% of females and 50% of males reported that their best friends provided a lot of support for them to be physically active.

By country

More than 50% of students in Fiji (47% females; 63% males) reported that their best friends provide a lot of support for physical activity, compared with approximately 40% of students in New Zealand (39% females; 42% males) and Tonga (39% females; 44% males), and fewer than 30% in Australia (20% females; 30% males).

By gender and ethnicity

In Fiji and Australia, males were more likely than females to report a lot of peer support for physical activity. In New Zealand, nearly half of Pacific students (47% females; 49% males) and one-third of Māori students (30% females; 37% males) reported a lot of peer support for physical activity (Figure 26).

Figure 25. Proportion of students bothered by dogs when walking in their neighbourhood by country

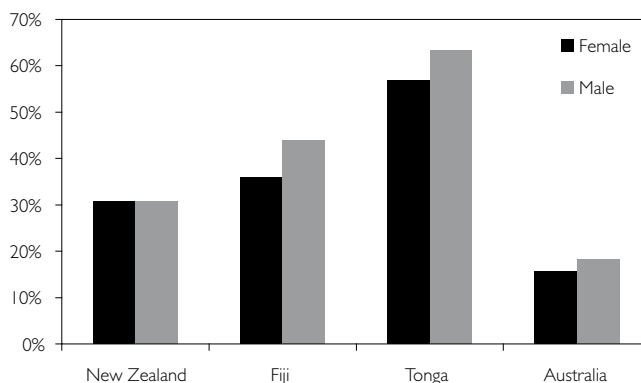


Figure 26. Proportion of students whose friends provide a lot of support for them to be physically active by ethnicity – New Zealand

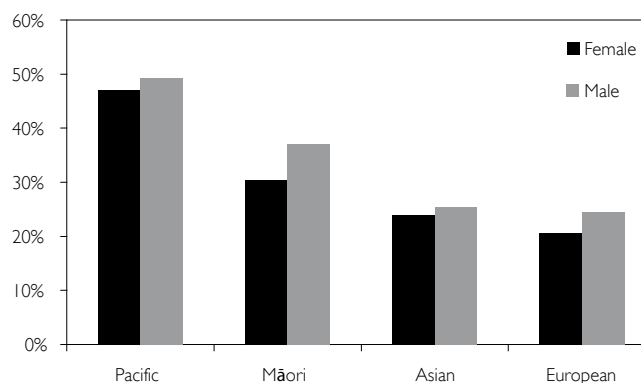


Table 20. Neighbourhood and community factors

	New Zealand					Fiji				Tonga	Australia	All four countries
	Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
	%	%	%	%	%	%	%	%	%	%	%	%
Feel safe in neighbourhood at night												
Female	67	70	66	69	68	58	58	47	58	57	81	64
Male	77	78	71	62	75	81	83	84	82	75	90	81
Parents think neighbourhood is safe at night												
Female	28	29	37	34	30	32	32	17	31	64	45	43
Male	35	39	37	35	36	58	59	40	58	73	59	60
Bothered by dogs when walking in neighbourhood												
Female	32	31	27	25	31	35	36	34	36	57	16	34
Male	32	32	23	30	31	42	45	35	44	63	18	37
Bothered by traffic when walking in neighbourhood												
Female	30	24	22	13	26	33	27	24	29	62	10	29
Male	30	24	19	17	26	32	31	19	31	68	14	30
Bothered by other people when walking in neighbourhood												
Female	23	22	18	16	22	38	30	26	29	45	8	27
Male	25	21	14	16	22	31	27	18	31	47	9	25
Best friends provide a lot of support for physical activity												
Female	47	30	24	21	39	54	42	38	47	39	20	39
Male	49	37	25	25	42	63	63	55	63	44	30	47

Quality of Life Indicators

The survey included several questions to assess student's health-related quality of life. The quality of life indicators described in this paper were measured using the PedsQL™ Generic Core Scale (adolescent 13-18 year module), developed by Dr. James W. Varni (Varni et al. 1999). The set of questions (PedsQL™) has been well-tested and is able to accurately measure quality of life in a way that is appropriate for adolescents (Varni et al. 2001, 2002, 2003). The questions used were designed to measure the core dimensions of health on four scales (physical functioning, emotional functioning, social functioning and school functioning) for adolescents. Overall quality of life scores and scale scores are not reported in this document.

Key points

- Across the multiple dimensions of health, a high proportion of students in Fiji and Tonga reported difficulties with many indicators of quality of life.
- Males were more likely to report higher quality of life indicators in the dimensions of physical functioning (such as difficulties walking, running, playing sport, low energy and emotional functioning (such as feeling scared, sad, angry, worried) than females.
- Many of the Indigenous students in Fiji reported difficulties with tasks (such as keeping up with school work, getting along with other teenagers) within the social functioning and school functioning dimensions of health.

Physical functioning indicators

A high proportion of students reported sometimes having difficulty lifting heavy objects (45% females; 32% males), running (31% females; 19% males), and playing sport or doing exercises (26% females; 18% males). Approximately half of students reported getting aches or pains sometimes or more often (Table 21).

By country

A high proportion of students from Fiji and Tonga reported having difficulties with their physical functioning. More than 30% of students in Fiji and Tonga reported sometimes having difficulty walking 100 metres or running compared with approximately 10% of students in Australia and New Zealand. Similarly, nearly 50% of students in Tonga reported sometimes having difficulty playing sports or doing exercises (52% females; 42% males) and lifting heavy objects (58% females; 54% males) (Figure 27). Nearly 60% of students in Fiji (68% females; 56% males) and Tonga (61% females; 56% males) reported sometimes getting aches compared with approximately 40% of Australian students and 30% of students in New Zealand.

By gender and ethnicity

In many cases, females were more likely than males to report some difficulty with their physical functioning. In Fiji, females were more likely to sometimes have difficulty walking more than 100 metres (40% females; 22% males), running (40% females; 22% males), and lifting heavy objects (56% females; 37% males). In Fiji, the Indigenous students reported a high level of difficulty with many of the physical functioning indicators. Approximately one-third of Indigenous students reported sometimes having difficulty walking 100m (43% females; 28% males), playing sports or doing exercises (33% females; 24% males), and helping around the house (30% females; 29% males). In New Zealand, few gender or ethnic differences were observed.

Emotional functioning indicators

A high proportion of students reported having negative feelings sometimes or more often that would impact on their quality of life. More than half of all students reported feeling angry (65% females; 58% males) and nearly 50% of students reported feeling sad (Table 22).

By country

Across many of the indicators of emotional functioning, students from Fiji and Tonga reported high levels of poorer emotional functioning. More than 60% of students from Fiji and Tonga reported having feelings of sadness or anger sometimes or more often. In Fiji, 67% of females are sometimes worried about what will happen to them, compared with 62% of females in Tonga, 34% of females in New Zealand, and 33% of females in Australia.

By gender and ethnicity

In general, female students were more likely to report poorer emotional functioning than male students. In Australia, females were more likely than males to report sometimes feeling scared (26% females; 12% males) or sad (50% females; 23% males) or have difficulty sleeping (36% females; 29% males). In New Zealand, nearly 50% of Asian students reported sometimes or more often having feelings of anger (52% females; 47% males) and more than one-third reported feelings of sadness (45% females; 34% males) (Figure 28).

Figure 27. Proportion of students having difficulty playing sports or doing exercise sometimes or more often by country

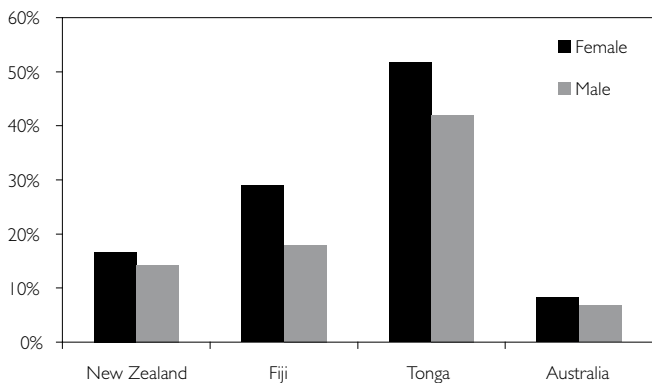
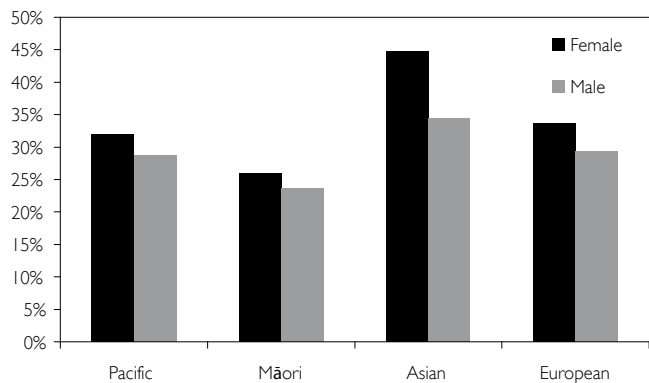


Figure 28. Proportion of students who report feeling sad sometimes or more often by ethnicity – New Zealand



Social functioning indicators

Approximately 30% of students reported sometimes having trouble getting along with other teenagers (32% females; 27% males), being teased by other teenagers (28% females; 30% males), or finding it hard to keep up with their peers (32% females; 25% males) (Table 26).

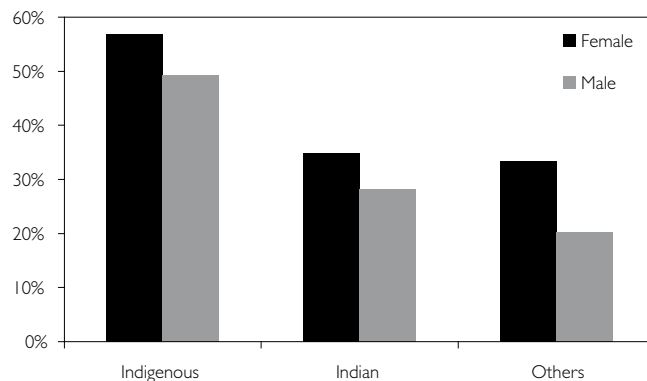
By country

A high proportion of students from Tonga (48% females; 47% males) and Fiji (44% females; 36% males) reported sometimes having difficulties getting along with other teenagers compared with fewer than 20% of students in New Zealand (20% females; 17% males) and Australia (17% females; 19% males). Likewise, approximately 40% of students in Tonga (49% females; 42% males) and Fiji (42% females; 33% males) sometimes have difficulty keeping up with other teenagers than students and approximately one-quarter of students in Tonga (24% females; 32% males) and Fiji (24% females; 24% males) said that other teenagers do not want to be their friend.

By gender and ethnicity

In Fiji, a high proportion of Indigenous students reported having trouble getting along with other teenagers (57% females; 49% males), that they cannot always do things other teenagers can (44% females; 36% males) and that it is hard to keep up with other teenagers (56% females; 47% males) (Figure 29).

Figure 29. Proportion of students who have trouble getting along with other teenagers by ethnicity – Fiji



School functioning indicators

Approximately 50% of all students reported that they sometimes forget things and 40% reported that they sometimes find it hard to pay attention in class or keep up with their school work (Table 24).

By country

High proportions of students in Fiji and Tonga reported difficulties on many of the school functioning indicators. More than 50% of students in Tonga and 40% of students in Fiji sometimes having difficulty paying attention in class, have difficulty keeping up with school work, and miss school due to sickness. In contrast, approximately one-third of students in Australia and New Zealand reported these issues.

By gender and ethnicity

Few differences by gender in school functioning indicators within each country were observed. In Fiji, nearly 60% of Indigenous students (57% females; 59% males) reported having difficulty keeping up with their schoolwork, compared with 40% of students of Other ethnicities (43% females; 38% males) and one-third of Indo-Fijian students (31% females; 33% males).

Table 21. Physical functioning indicators related to quality of life

	New Zealand					Fiji				Tonga	Australia	All four countries
	Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
	%	%	%	%	%	%	%	%	%	%	%	%
Difficulty walking more than 100m, sometimes or more often												
Female	15	16	13	6	13	43	39	26	40	39	4	26
Male	14	12	10	4	10	28	18	7	22	35	3	16
Difficulty running, sometimes or more often												
Female	24	16	20	19	22	39	40	33	40	44	14	31
Male	20	12	20	13	18	25	21	12	22	36	8	19
Difficulty playing sport or doing exercises, sometimes or more often												
Female	18	11	18	19	17	33	28	25	29	52	8	26
Male	16	10	17	11	14	24	17	9	18	42	7	18
Difficulty lifting heavy objects, sometimes or more often												
Female	35	28	33	35	33	55	58	45	56	58	30	45
Male	28	25	32	25	27	42	35	21	37	54	17	32
Difficulty bathing self, sometimes or more often												
Female	4	1	3	0	3	16	5	4	9	15	1	7
Male	4	1	2	1	3	19	7	4	11	22	1	8
Difficulty helping around house, sometimes or more often												
Female	12	8	9	6	10	30	14	16	21	38	6	18
Male	12	10	9	7	11	29	14	15	20	41	10	17
Get aches and pains, sometimes or more often												
Female	33	28	24	33	31	74	65	64	68	61	45	53
Male	32	26	31	28	31	66	50	43	56	56	39	45
Have low energy, sometimes or more often												
Female	30	25	25	29	29	49	47	42	47	51	29	40
Male	27	21	29	21	25	34	29	20	31	46	19	28

Table 22. Emotional functioning indicators related to quality of life

	New Zealand					Fiji				Tonga	Australia	All four countries
	Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
	%	%	%	%	%	%	%	%	%	%	%	
Feel afraid or scared, sometimes or more often												
Female	23	16	27	16	21	64	63	51	63	55	26	44
Male	16	15	24	14	17	36	34	22	35	40	12	25
Feel sad, sometimes or more often												
Female	32	26	45	34	32	73	75	72	74	71	50	58
Male	29	24	34	29	28	64	56	47	59	59	23	43
Feel angry, sometimes or more often												
Female	44	43	52	41	44	79	81	75	80	73	53	65
Male	43	37	47	41	42	74	71	63	72	62	51	58
Have trouble sleeping, sometimes or more often												
Female	20	25	23	37	23	44	34	45	40	45	36	35
Male	21	21	27	31	23	38	27	25	40	45	29	30
Worried about what will happen to them, sometimes or more often												
Female	36	25	37	32	34	73	63	72	67	62	33	52
Male	32	27	33	31	31	61	45	50	52	53	22	40

Table 23. Social functioning indicators related to quality of life

	New Zealand					Fiji				Tonga	Australia	All four countries
	Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
	%	%	%	%	%	%	%	%	%	%	%	
Have trouble getting along with other teenagers, sometimes or more often												
Female	23	16	15	14	20	57	35	33	44	48	17	32
Male	19	14	15	17	17	49	28	20	36	47	19	27
Other teenagers do not want to be their friend, sometimes or more often												
Female	17	12	15	21	16	32	18	19	24	24	20	21
Male	14	13	16	22	15	33	17	16	24	32	21	21
Other teenagers tease them, sometimes or more often												
Female	20	15	19	21	19	39	21	36	29	47	22	28
Male	21	17	15	27	20	45	22	28	31	58	27	30
Cannot do things other teenagers can, sometimes or more often												
Female	21	15	13	12	18	44	30	36	37	43	13	28
Male	21	14	13	14	18	36	25	23	29	37	13	23
Hard to keep up with other teenagers, sometimes or more often												
Female	22	13	14	13	18	56	31	38	42	49	13	32
Male	20	15	15	13	18	47	25	22	33	42	12	25

Table 24. School functioning indicators related to quality of life

	New Zealand					Fiji				Tonga	Australia	All four countries
	Pacific	Māori	Asian	European	All	Indigenous	Indian	Others	All	All	All	
	%	%	%	%	%	%	%	%	%	%	%	
Hard to pay attention in class, sometimes or more often												
Female	34	32	20	37	32	56	37	53	45	53	36	41
Male	31	35	20	35	31	53	32	44	41	59	39	40
Forget things, sometimes or more often												
Female	41	41	33	42	40	70	57	63	63	49	48	52
Male	44	42	34	41	42	67	49	56	56	52	47	50
Have trouble keeping up with school work, sometimes or more often												
Female	35	30	24	34	33	57	31	43	43	51	32	39
Male	34	33	26	25	32	59	33	38	43	57	37	40
Away from school due to sickness, sometimes or more often												
Female	30	26	19	21	27	53	34	34	43	54	24	36
Male	29	29	18	20	27	49	32	29	39	59	21	34
Away from school to go to the doctor, sometimes or more often												
Female	27	19	13	16	23	49	35	25	40	41	13	31
Male	26	24	17	11	23	47	33	22	38	50	14	30

Study Methodology

Design of OPIC Study

The primary aim of the OPIC study is to evaluate the effectiveness of community-based obesity prevention strategies at sites in Fiji, Tonga, New Zealand and Australia. It uses a quasi-experimental study design to compare high school students attending schools in intervention areas with students at comparison schools in control areas. Baseline and follow-up surveys were carried out during 2005-2008. Overviews of the OPIC study design and the interventions in each of the four sites have been reported (Schultz et al., 2007; Swinburn et al., 2007).

The data in this report comes from baseline surveys carried out in 2005 (and in 2006 at some sites). Ethics approval was given by the relevant institutional committees in each country, and consent to participate was provided by students (if legally old enough) or by their parents or guardians.

Sample size

The sample size calculations are based on the aims of the intervention component of the OPIC study. The primary outcome variable is change in body mass index (BMI), with changes in BMI z-score, weight, and percent body fat being closely related secondary outcome variables. Because data on the standard deviation (SD) of changes in BMI over 3 years in these populations were not available, cross-sectional data were used from a secondary school survey in Auckland which had a high number of Pacific participants (SD for BMI 5.22 kg/m², SD for weight 16.8 kg). Assuming a within-person correlation of 0.8, a sample size of 1000 each in the intervention and comparison arms of the study would give sufficient power ($\beta=0.8$, $\alpha=0.05$) to detect a difference in BMI of 0.41 kg/m² or 1.3 kg. The Auckland study showed no clustering effects by school once ethnicity was controlled for. To allow for non-response at baseline and dropouts over the 3-year intervention period, a target was set of measuring 1500 participants in each group. Since Fiji has two large and quite different ethnic groups (Fijians and Indo-Fijians), the study aimed to measure 1500 participants in each ethnic group in both intervention and comparison groups. The above sample size calculations do not necessarily apply to the baseline data in this report which come from single interviews of each student rather than repeat interviews to measure change over time.

Interview process

A process was developed that allowed interviewing of a whole class within a school period (40-50 minutes), so that the effect of the survey on school educational activities was minimized. Piloting of questions was carried out with 85 students at four Auckland schools in 2004 to assess comprehension of questions and the time to complete them. The final list of questions chosen for the survey took an average of 28 minutes (range 17-28 minutes) to complete during piloting. For most students in the baseline survey, all data collection (including anthropometry) took place within a single school period.

Questionnaires

The questions developed for the survey, including several from the 1995 Australian National Nutrition Survey (AusStats, 1998), New Zealand 2002 National Children's Survey (Parnell et al, 2003) and National Health and Medical Research Council (NHMRC) Dietary Key Indicators Study, covered the following topics: demography, food and nutrition behaviours, physical activity and leisure time activities, perception and attitudes of body size, family and home environment, school environment, and neighbourhood environment. A copy of the questions included in the survey, plus further details of their source, is available electronically at: <http://www.deakin.edu.au/hmnbs/who-obesity/>.

In addition, two quality of life questionnaires – the Pediatric Quality of Life (PedsQLTM) (Varni et al 1999) and the Assessment of Quality of Life (AQoL-2) (Richardson et al. 2004) – were answered by students, although only results from the former are in this report. Baseline questionnaires were completed by students using hand-held computers. Students read the question on the screen and used a stylus to select their responses; no keyboard entry was required. Data were electronically transferred from the hand-held computers to a central database daily and then imported into statistical software and collated for analysis. In Tonga, the questionnaire was translated into the Tongan language and checked with back translation.

The number of student responses within each aspect of the survey varies due to technical failures resulting in data loss and/or students declining to complete aspects of the survey. The number of students completing each aspect of the survey is described in Table 25.

Table 25. Number of students completing each component of baseline measurements

	New Zealand	Fiji	Tonga	Australia	Total
Total	4215	7237	2535	3163	17,150
Anthropometry	4215	7237	2535	3117	17,104
Food and Activity Survey	4215	6166	2090	3097	15,568
Quality of Life Survey	4209	6353	1937	3110	15,609

Anthropometry

While students were completing the questionnaires, anthropometry measurements were carried out behind a screened off area in the room to provide privacy. Measurements were made by trained research staff, using standardized procedures and protocols across all study sites. Students completed anthropometric measurements without shoes, socks or stockings, and wearing only light clothing. Weight was measured on a segmental body composition analyser (Tanita BC-418) to the nearest 0.1 kg; height was measured on portable stadiometers to the nearest 0.1 cm. Waist circumference was measured in the horizontal plane of the umbilicus (indicated with a finger by participants) to the nearest 0.1 cm.

BMI (weight in kg/(height in m)²), waist/height ratio and BMI-Z score (calculated against the 2000 CDC growth reference from the United States using the zanthro module in STATA) were calculated. The International Obesity Task Force (IOTF) age-specific BMI cut-offs were also used to classify children's weight status as either thinness grades 1-3, healthy weight, overweight or obese (Cole et al, 2000; Cole et al, 2007) using the LMS Growth Microsoft Excel module (Cole et al, 2007).

Response rates

The total response rate across all four countries was 61%. Student response rates were calculated by dividing the number of participating students by the number of eligible students (determined by the school roll). The response rates for each study site are summarized in Table 26.

Data analyses

Data sets from each of the four sites were merged into a single data set using a common list of variable names. Statistical analyses in this report were conducted using SAS statistical software (version 9.1). The tables within the report include unadjusted frequencies or population means. When comparisons between two sub-groups are made within the text of the report (e.g. females were more likely than males to...), analyses were conducted to correct for the design-effects of clustered sampling and the confounding effects of age and gender. The SURVEY procedures in SAS were used to conduct these analyses. Statistical significance was set at $p < 0.05$.

Table 26. Student response rates by country

	Number of students participating	Number of students from school roll	Response Rate
New Zealand	4250	7373	58%
Fiji	7237	9785	74%
Tonga	2535	4448	57%
Australia	3163	6508	49%
Total	17,185	28,114	61%

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